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AMERICAN JOURNAL OF OPHTHALMOLOGY

VOLUME 28 OCTOBER, 1945 NUMBER 10

ACQUIRED BLEPHAROPTOSIS*

(SYMPTOMATIC PTOSIS)

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Philadelphia

On two occasions before it has been my privilege to present to this College, discussions on congenital ptosis. The first of these, in 1937,[1] was a discussion of the surgical correction upon anatomic principles. The second, in 1943,[2] was a classification of congenital ptosis and was based upon the analysis of a series of consecutive cases of congenital ptosis.

Since the publication of this classification, additional cases have appeared which tended to raise the incidence of some of these classes—that is, those of the complicated cases—at the expense of another, but in general, the differences are not significant.

Acquired ptosis is of interest not so much in the number of cases seen, as in the various etiologic factors that cause it. A table of percentages of etiologic incidence, has, however, relatively little value compared to the etiologic factors. One observer, associated with a large neurologic and neurosurgical service, would find an unusually high incidence in such cases; another, an ophthalmologist with a large practice in industrial ophthalmology, would find that trauma predominated as a cause; a third, closely associated with an extensive endocrinologic service, would find a disproportionate incidence in myasthenia gravis and in the thyrotoxic forms of acquired ptosis. For this reason, no attempt is to be made to give the percentage incidences of the various forms in this analysis of somewhat less than 250 cases. It is sufficient to call attention to its relative frequency, and its many possible causes. While the condition is essentially a symptom from other pathologic situations, it needs correction, frequently separate from that necessary for the basic cause of the ptosis. Symptomatic ptosis is a better term than acquired, it is more descriptive.

Cases appear repeatedly which simulate to a marked degree congenital ptosis. The history of the patient's disease should be sufficient to arrive at an estimate of the etiology, if not by affirmation at least by the elimination of various probable factors. This applies especially to central (nuclear) and brain-stem pathologic change, for in these conditions a remarkable similarity to true congenital ptosis frequently appears. The combination of a superior rectus with a levator palsy, as a single pathologic finding, would make diagnosis difficult without an accurate history.

With but few exceptions this classification is based upon cases seen at The Graduate Hospital, The Wills Eye Hospital, The Philadelphia Hospital for the Insane, and as private patients through the office.

* From the Graduate Hospital, The University of Pennsylvania, Graduate School of Medicine, and The Wills Eye Hospital. Presented before the Section of Ophthalmology, The Philadelphia College of Physicians, on January 18, 1945.

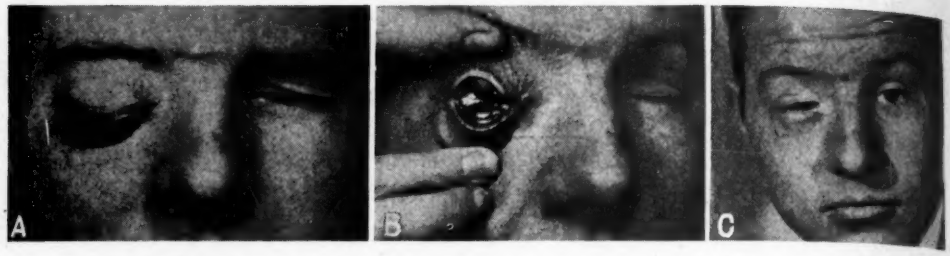

Fig. 1 (Spaeth). A and B, complete avulsion of the levator, traumatic; and C, the end result following surgery.

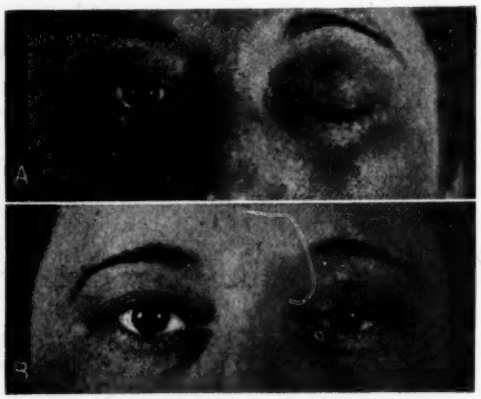

Fig. 2 (Spaeth). A, partial sectioning of the levator. B, following surgical reattachment.

The principal causes for acquired ptosis are: posttraumatic conditions, neuromuscular situations, and complications of neurologic and/or neurosurgical conditions. Some of the subdivisions to be given intermesh, necessarily so, in that the classification is based upon etiologic as well as anatomic situations.

CLASS 1. TRAUMATIC PERIPHERAL

A. Peripheral, as one would see with a complete (fig. 1), or an incomplete (fig. 2), sectioning of the levator; hence the inability to elevate the lid.

B. Peripheral and Cicatricial, in which the muscle itself is uninvolved, but scar formation prevents normal amplitude of movement, scar tissue either in the skin (fig. 3), or in the cul-de-sac (fig. 4), or in both (fig. 5).

C. Peripheral and Cicatricial, from conjunctival and muscle involvement as with a trachomatous symblepharon (fig. 6), or as the result of chemical or hot-

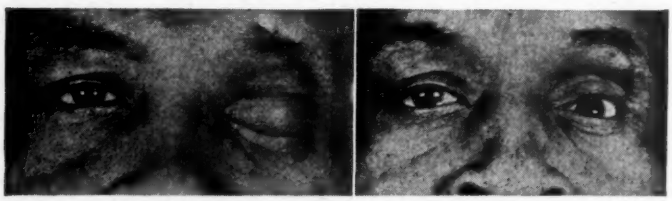

Fig. 3 (Spaeth). Ptosis before and after scar resection.

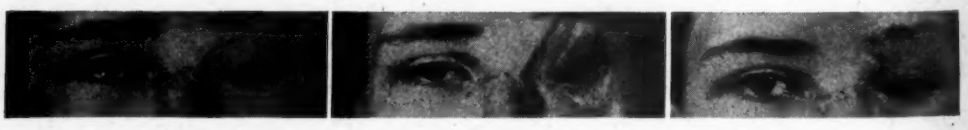

Fig. 4 (Spaeth). A traumatic case wherein resuturing of the levator was combined with the removal of a scar adherent to the bone, and an enucleation due to a fracture of the orbit. The middle photograph shows the marked enophthalmos with the globe lying in the ethmoidal sinus. The third picture of this series is the end result.

metal burns, wherein the symblepharon lies largely in the superior fornix (fig. 7).

D. Peripheral, resulting from the destruction of bone tissue as in osteomyelitis (fig. 8), or from loss of soft tissues of the upper lid, or a combination of the two (figs. 9 and 10). This should also include the ptosis following blepharoplasties (figs. 11 and 12). The surgery of a superior- or supraorbital-route orbitotomy, even with the best surgical manipulations may be followed either by the development of ptosis (fig. 13), or the exaggeration of a ptosis previously present (fig. 14), but to a lesser degree.

E. The ptosis which appears, at times, after reconstruction of a socket. It is probable that a large number of these cases are due to a more or less complete destruction of the levator as the result of the reconstructive surgery. It emphasizes the importance of not injuring the levator in the superior cul-de-sac during a socket reconstruction (figs. 15 and 16).

Fig. 5 (Spaeth). A rather similar situation wherein chronic scarring, lid and cul-de-sac, has occurred from a subacute to chronic tuberculous osteomyelitis.

Fig. 6 (Spaeth). Ptosis with trachoma. The deformity of the tarsal plates is especially evident.

Fig. 7 (Spaeth). Ptosis with superior-fornix chemical-burn symblepharon.

Class 2. Traumatic, central and cerebrospinal

These are essentially the result of a third-nerve paresis or paralysis; or of a cervical sympathetic paralysis through vascular pathologic change; or of sectioning of the nerve, and will be considered later, herein.

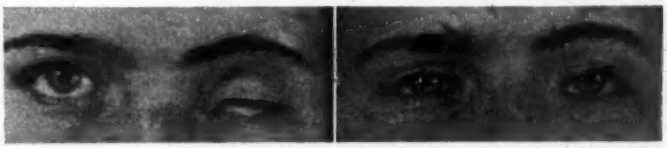

Fig. 8 (Spaeth). Ptosis following osteomyelitis, also after its surgical correction.

Class 3. Peripheral, inflammatory or neoplastic, the result of intraorbital pathologic change

Many of these cases have, as an accompaniment, unilateral exophthalmos

Fig. 9 (Spaeth). The ptosis of a complete upper-lid reconstruction.

Fig. 10 (Spaeth). The ptosis following osteomyelitis of a formerly present, chronic, suppurating frontal sinusitis.

Fig. 13 (Spaeth). Residual ptosis following orbitotomy for a retrobulbar cyst (patient of Dr. Warren Reese).

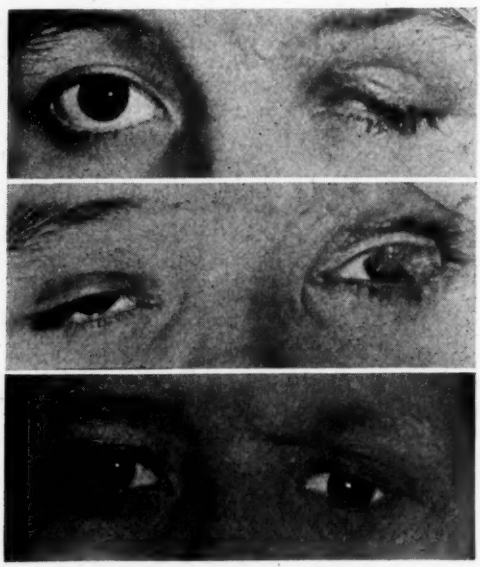

Fig. 11 (Spaeth). Ptosis following blepharoplasty.

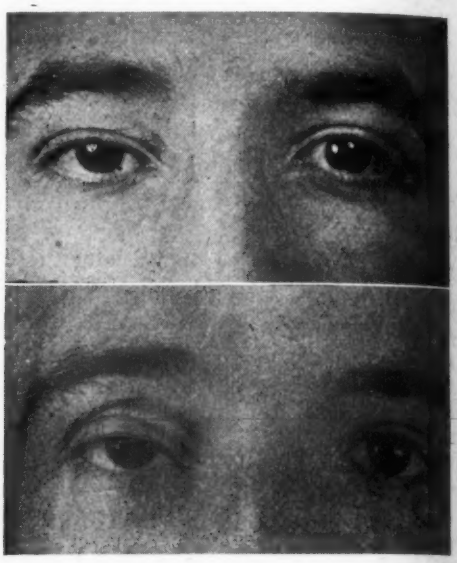

Fig. 14 (Spaeth). Cicatricial ptosis following the removal of a dermoid from the lateral wall of the orbit.

Fig. 12 (Spaeth). End result in this case.

with a displacement of the globe in various directions. Figure 17, A and B, depict a long-standing ptosis from retrobulbar wooden foreign bodies which had been in the orbit for almost one year; figure 18 the ptosis of a retrobubar pseudotumor; figure 19 the ptosis of a retrobulbar neuroma before and after the orbitotomy. Figure 20 shows the ptosis of a neurofibroma of the lids; figure 21, the ptosis before and immediately after surgery for a mucocele of the frontal sinus; figure 22 the ptosis of an orbital sarcoma; figure 23 the ptosis of an orbital hemangioma. Figure 24 illustrates a tremendous degree of ptosis from a carcinoma which arose in the maxillary antrum and extended into the orbit; figure 25 the ptosis of a very possible gumma of the orbit. (This diagnosis was neither histologically nor therapeutically confirmed in that the patient left Wills Hospital before this was done. She did have, however, the

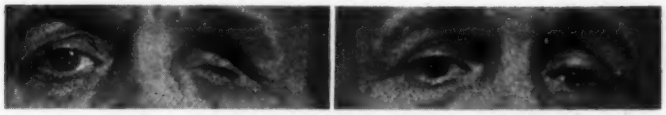

Fig. 15 (Spaeth). Ptosis of socket reconstruction.

Fig. 16 (Spaeth). Post-socket reconstruction ptosis wherein failures in previous surgery augmented the post-surgical ptosis.

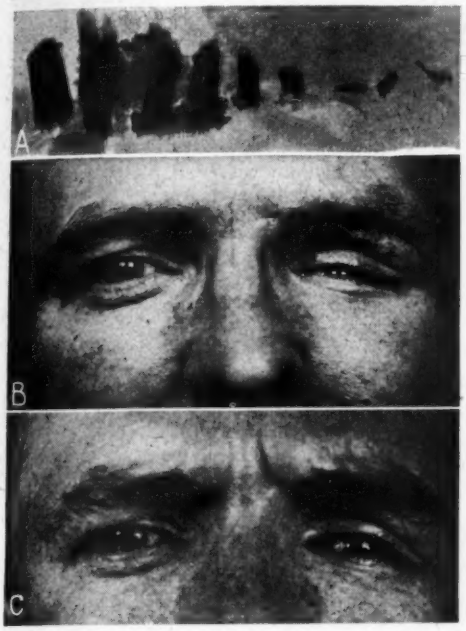

Fig. 17 (Spaeth). A, foreign bodies, pieces of a wooden bat (very slightly magnified photographically), removed from the orbit. B and C show the ptosis induced by these retrobulbar foreign bodies—before and after removal.

Fig. 18 (Spaeth). The chronic inflammatory ptosis of retrobulbar pseudotumor, chronic phlegmon.

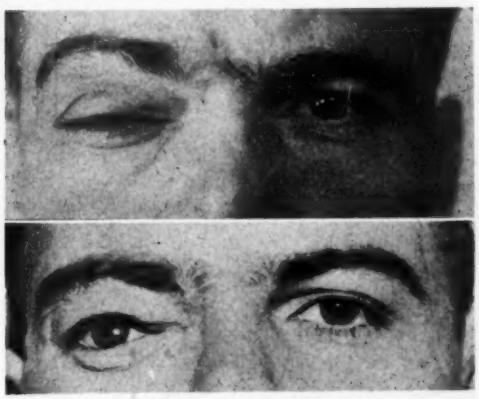

Fig. 19 (Spaeth). The ptosis of retrobulbar neuroma before and after surgical removal. Enucleation was necessary in this case.

serologic indications and the subjective symptoms of an orbital gumma.) Figure 26 presents the ptosis with a pachydermatocele of a profound degree of neurofibromatosis of the orbit.

Class 4. Atonic ptosis

This is the ptosis of senility, of blepharochalasis, and should also include the essentially atonic ptosis which one sees occasionally after old simple enucleations, wherein there had been no Tenon's capsule implant. In these cases there is usually a large, dry, atrophic socket with a flabby, relaxed upper lid. Figure 27 shows such a form of ptosis. Figure 28 is an example of the ptosis of blepharochalasis.

Fig. 20 (Spaeth). The ptosis of neurofibromatosis of the lid.

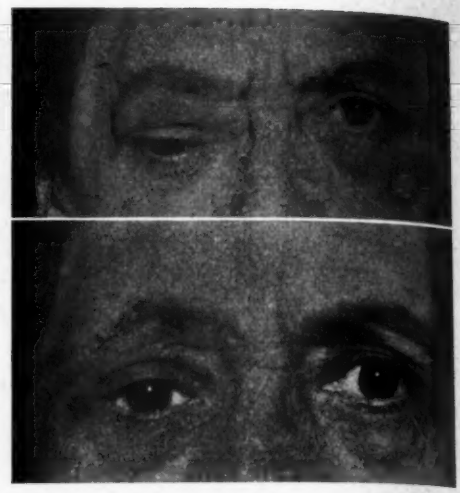

Fig. 21 (Spaeth). The ptosis of a mucocele of the frontal sinus before and immediately after its surgical extirpation.

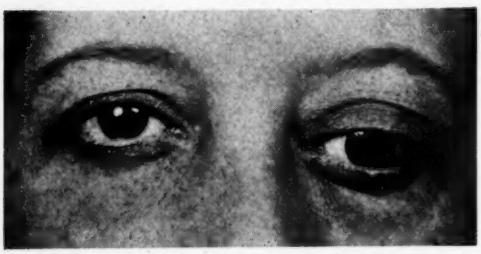

Fig. 22. (Spaeth). The ptosis and exophthalmos of retrobulbar sarcoma (patient of Dr. A. Howland).

Fig. 23 (Spaeth). The ptosis of retrobulbar hemangioma.

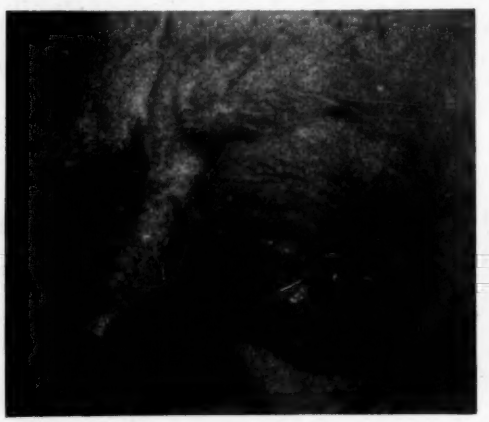

Fig. 24 (Spaeth). High degree of ptosis of an extending carcinoma from a maxillary sinus (patient of Dr. James S. Shipman).

Fig. 25 (Spaeth). The ptosis of a probable retrobulbar gumma (patient of Dr. I. S. Tassman).

Class 5. Neuromuscular disturbances

This form of ptosis is best illustrated by that seen after the physiologic administration of curare, for it exemplifies the basic pathologic situation. Myasthenia gravis is the characteristic pathologic condition (fig. 29). The myasthenia of a thymic tumor is somewhat similar. The myasthenia that occurs in association with the ophthalmoplegias of thyrotoxicosis is

a third example (fig. 30). These three forms of ptosis are to be considered as a symptom rather than the disease itself. All three of them are not uncommonly associated with a paralysis of the superior rectus as well. The exophthalmos and the ophthalmoplegias of the thyrotrophic disturbances are both secondary to the muscle changes, and the two, basic etiology and the result, are otherwise not related to each other. In addition, in thyrotrophic disturbances upward movements are frequently affected at first, and these are more commonly associated with lid retraction rather than with ptosis. Figure 31 illustrates this very well. It is an ophthalmoplegia associated with thyrotrophic exophthalmos, with a paralysis of the superior rectus outstanding, and with lid retraction. Figures 30 and 31 should be compared, one with the other. The differentiation between these three forms of myasthenia is interesting. The ptosis of curare responds to prostigmine, as does the ptosis of myasthenia gravis, especially when this is accompanied by some mild physical exertion. The ptosis of a thymic tumor is cured by the removal of the offending gland. The ptosis of thyrotoxic myasthenia does not respond to prostig-

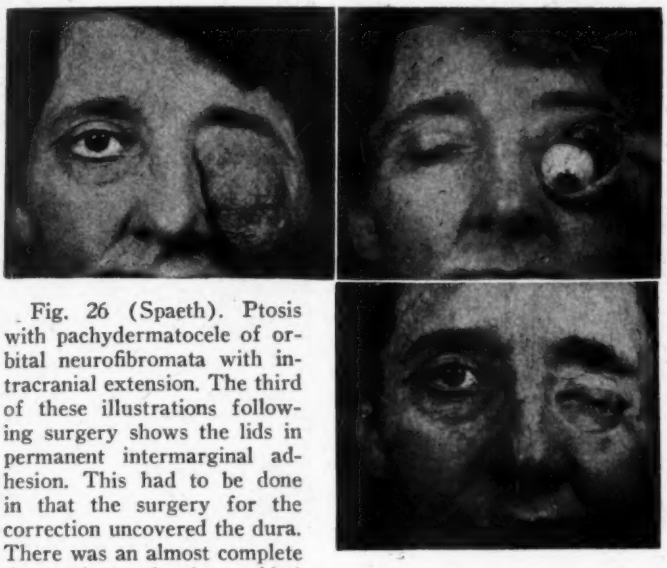

Fig. 26 (Spaeth). Ptosis with pachydermatocele of orbital neurofibromata with intracranial extension. The third of these illustrations following surgery shows the lids in permanent intermarginal adhesion. This had to be done in that the surgery for the correction uncovered the dura. There was an almost complete destruction of the orbital roof. These permanent intermarginal adhesions were arranged in this manner to protect the dura from the extension of subsequent incidental infection (patient of Dr. J. S. Shipman).

Fig. 27 (Spaeth). The ptosis of an old, neglected enucleation before and after the surgical correction.

Fig. 28 (Spaeth). The ptosis of blephraochalasis.

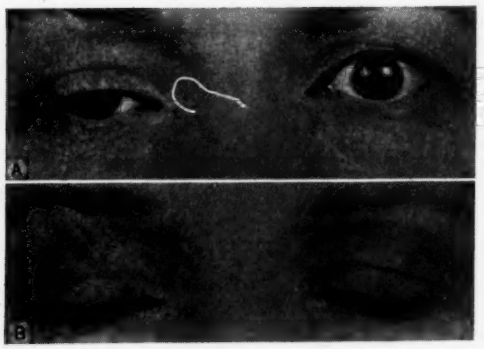

Fig. 29 (Spaeth). Ptosis of myasthenia gravis; involving the upper lid and the levator.

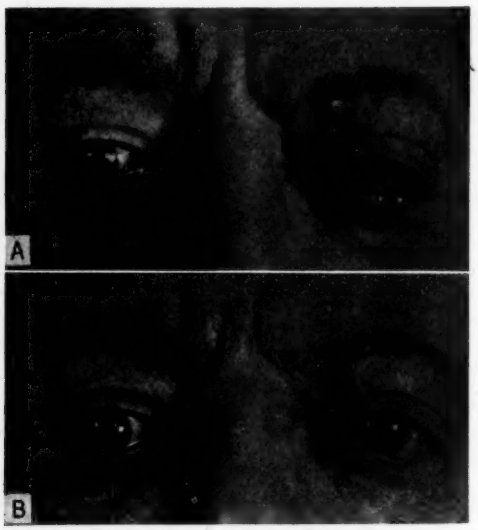

Fig. 30 (Spaeth). The ptosis of thyrotoxicosis subsequently corrected as in B following thyroidectomy and after a bilateral subzygomatic decompression for the exophthalmos.

mine and is associated with an elevated basal metabolic rate, with other general symptoms of toxicity.

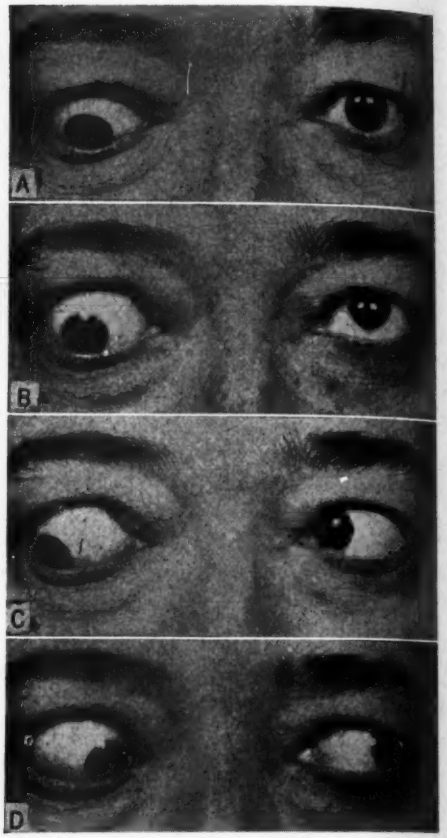

Fig. 31 (Spaeth). Ophthalmoplegia with lid retraction of thyrotrophic exophthalmos (patient of Dr. J. S. Shipman).

Class 6. The ptosis of cervical sympathetic involvement

This degree of ptosis is never so profound as is the ptosis of third-nerve levator involvement; the lid fold is usually intact. The commonest example of this is the classical ptosis present in Horner's syndrome. Figure 32 is a copy of Bing's famous original photograph as he presented it. Figure 33 shows the ptosis of a bilateral cervical sympathetic paraly-

sis. Both of these illustrate rather well the maintained orbital-palpebral fold characteristic of this type of ptosis. Figures 32 and 33 also show the miosis of this condition.

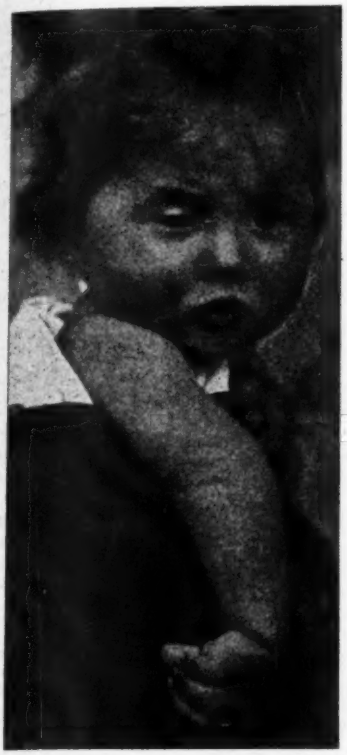

Fig. 32 (Spaeth). Sympathetic Horner's pupillary syndrome, associated with Klumpke's paralysis. From Bing's "Regional diagnosis." Ed. 11, Saint Louis, C. V. Mosby Co., 1943.

CLASS 7. THE PTOSIS OF THIRD-NERVE INVOLVEMENT

A. Peripheral extracranial. Figure 34 depicts a complete third-nerve palsy, permanent, internal as well as external, consequent upon the unintentional retention of a packing following the exenteration of the ethmoidal sinus. Figure 35 illustrates a ptosis with a simultaneous superior-rectus involvement; that is, both branches of the upper division of

Fig. 33 (Spaeth). Bilateral cervical sympathetic paralysis.

the third nerve were affected following a blow to the orbit. During the acute phase some exophthalmos was present. It is quite likely, therefore, that the condition was vascular in nature. Figure 36 presents a ptosis, with a sixth-nerve palsy,

Fig. 34 (Spaeth). Permanent ptosis, complete third-nerve paralysis following the retention of intrasinus packing following an ethmoidal sinutotomy.

Fig. 35 (Spaeth). Ptosis with paralysis of the superior rectus following a blow to the orbit.

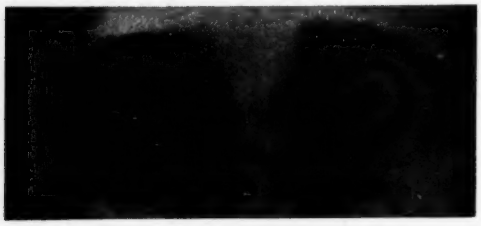

Fig. 36 (Spaeth). Ptosis with paralysis of the external rectus following a stab wound of the orbit.

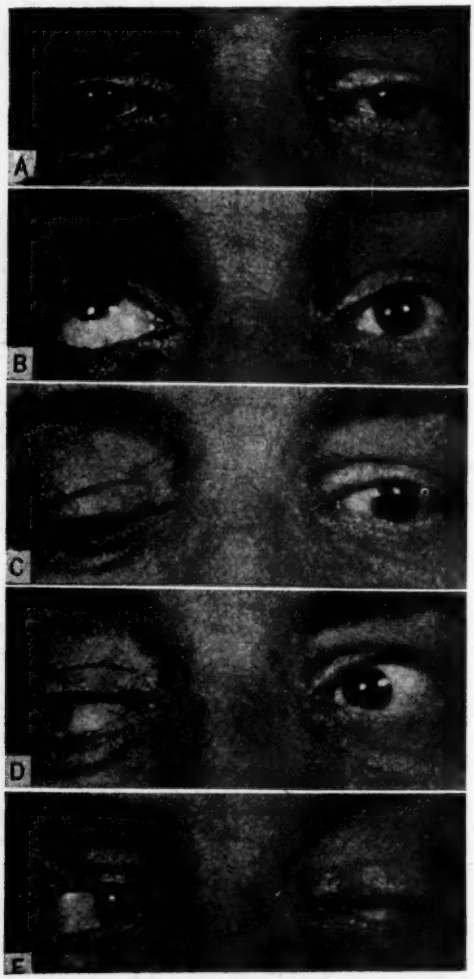

Fig. 37 (Spaeth). The ptosis of the pseudo-Graefe syndrome. O.S., involved eye: A, gaze to the front; B, upward gaze; C, downward gaze without ptosis; D, gaze to right and absence of ptosis; E, gaze to left with greatest degree of ptosis.

from a stab wound of the orbit. Similar situations are seen following gunshot wounds of the orbit and fractures through the medial superior and lateral walls of the orbit.

B. Infranuclear, but intracranial. This is the type of case usually encountered following injury, and is most commonly responsible for the pseudo-Graefe syndrome. Figure 37 depicts such an instance. The same type of ptosis is seen with perichiasmal pathologic change, with an aneurysm of the circle of Willis, and

Fig. 38 (Spaeth). Permanent ptosis following recovery from an interpeduncular hemorrhage. The case was preceded by a classical hemiplegia alternans superioris.

is a part of the temporary to permanent ptosis of hemiplegia alternans superioris from interpeduncular vascular pathologic change. The condition is essentially an incomplete third-nerve paralysis. Figure 38 illustrates such a situation. The temporary preoperative and not uncommon postoperative ptosis of intracranial neoplasms also falls into this class. Figure 39 shows permanent ptosis following a right-sided, temporal-lobe glioma (posterior portion), in which there was an almost complete permanent third-nerve palsy following recovery from the craniotomy. These infranuclear forms of ptosis may be either temporary or permanent, depending wholly upon the etiologic factor. Figure 40 presents a condition which should also be included in this subdivision in that it is a case of complete

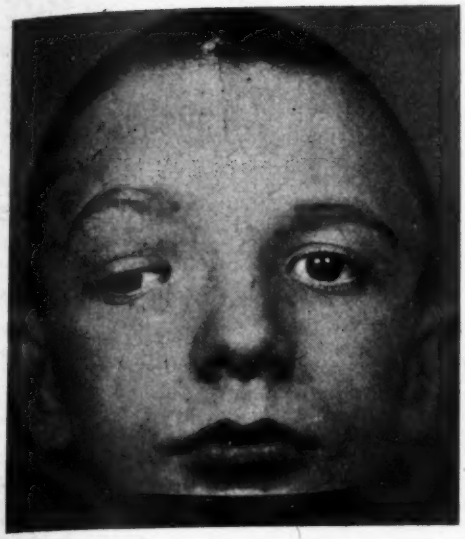

Fig. 39 (Spaeth). The permanent ptosis of an almost complete third-nerve palsy following a craniotomy for temporal-lobe glioma.

ptosis from cerebrospinal syphilis. One is not certain, however, whether this type of case should not be included with the third-nerve, nuclear, involvement instead.

C. Third-nerve ptosis from nuclear and intranuclear involvements. A complete third-nerve paralysis is, of necessity, rare, because of the extent of cortical substance that must be damaged to bring about such a condition. Incomplete nuclear conditions are more common. Figure 40, included under infranuclear cases, illustrates a syphilitic manifestion. Inflammatory, vascular, and degenerative

Fig. 40 (Spaeth). The ptosis of acquired syphilis.

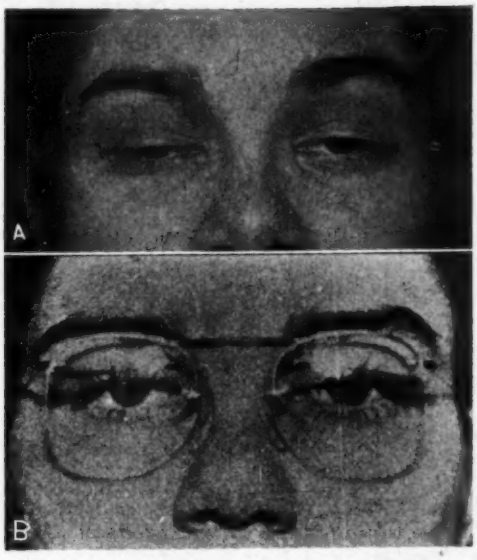

Fig. 41 (Spaeth). A, case of steadily progressing bilateral internal and external ophthalmoplegia, that type of case frequently spoken of as Graefe's disease. B, with crutch glasses worn.

conditions are the other subdivision histologic-etiologic factors. All three may be at times caused by syphilis; they may be the result of a virus infection, from bacterial

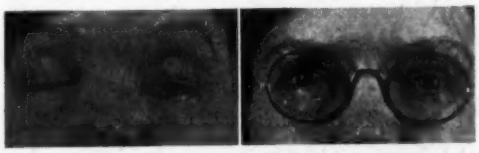

Fig. 42 (Spaeth). The bilateral internal and external ophthalmoplegia of old, quiescent lethargic encephalitis with Parkinsonism.

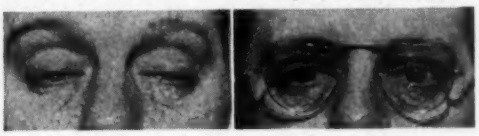

Fig. 43 (Spaeth). Ptosis of a frank, postinfluenzal encephalitis. The course and development of the ptosis was classical for this. The situation remained unchanged for 20 years, and was corrected by the use of properly fitted crutch glasses as illustrated.

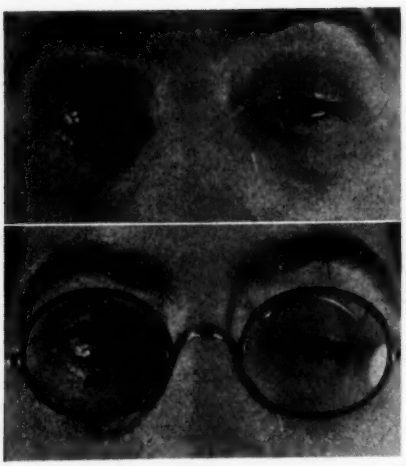

Fig. 44 (Spaeth). The dissimilar, markedly predominating left-sided external ophthalmoplegia which resulted from an encephalomyelitis accompanying anterior poliomyelitis.

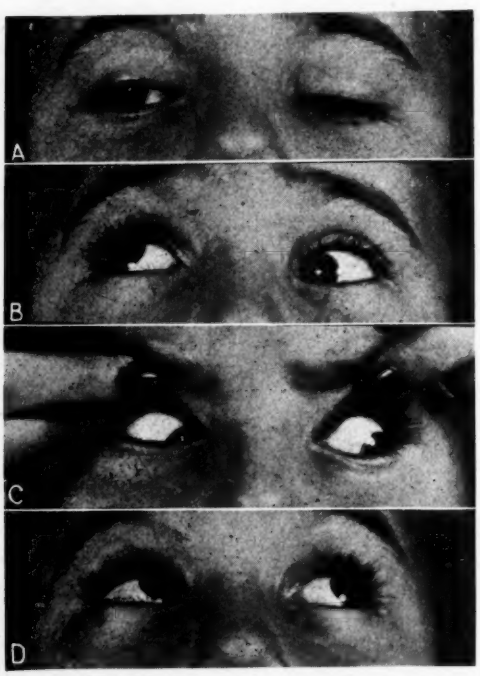

Fig. 45 (Spaeth). The ptosis of intracranial birth trauma. A, in repose; B, illustrating the paralysis of the inferior oblique on the left, with limitation of external rotation on the right. C illustrates the degree of ocular motility in external rotation to the left. D illustrates the intactness of the left superior rectus. The condition is a combination of right sixth, with left levator and inferior oblique muscles paralyzed.

invasion, or the result of disturbed metabolism. Trauma might be a very uncommon cause. The stationary and progressing forms of internal and external ophthalmoplegia, as seen with Graefe's disease, in its progressive characteristics (fig. 41), the permanent ptosis of lethargic encephalitis (fig. 42), and the permanent ptosis of postinfluenzal encephalitis (fig. 43) (if this is a separate pathologic entity), are all illustrative of these conditions. Encephalitis, which is not too rare an accompaniment of anterior poliomyelitis occasionally results in ptosis. Figure 44 illustrates such an instance. It is predominantly unilateral, but there is some bilateral involvement. Chronic inflammatory degenerative situations are well illustrated by the ptosis of cerebellar ataxia. Vascular involvements have already been discussed in part. Figure 37 illustrates such an instance. Another type of ptosis is that of ophthalmoplegic migraine. This is probably a recurring vascular condition terminating in central-nervous-system focal atrophy and the peripheral paralysis as seen; also not necessarily a complete third-nerve paralysis. This condition probably manifests the most complete type of combined internal and external ophthalmoplegia from nuclear pathology. Cases have been seen in which it was limited wholly to the sixth nerve. The intranuclear syndrome, as from a severe birth traumatism, also probably vascular in nature, is well illustrated in figure 45. The patient had an almost complete levator involvement on the left; with this a complete paralysis of the inferior oblique, and with a left-sided, and partial right-sided external-rectus involvement. The ocular syndrome was a result of very rapid forceps delivery (of necessity, for the mother was in extremis) and had other accompanying signs, especially in the earlier years of life, of intracranial damage.

Class 8. Ptosis with and of the pseudo-Graefe syndrome

This has been discussed, under infranuclear third-nerve involvements.

Class 9. Hysterical ptosis

Two forms of hysterical ptosis have been described, a paralytic as well as the pseudoptosis of blepharospasm. Various observers have described both of these types, speaking of them as either a flaccid or a contracture form. Figure 46 depicts such an instance, the contracture type of hysterical ptosis. This case was previously presented before this Section.[3] Bilateral hysterical ptosis is rather uncommon. The

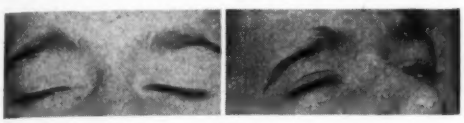

Fig. 46 (Spaeth). The side and front views of hysterical ptosis.

unilateral form is much the more common of the two.

In discussing etiologic factors, there are probably other conditions that cause ptosis of the lid. The cases presented,

TABLE 1

Class 1. Traumatic peripheral ptosis.
- Cicatricial and with soft-tissue contraction.
- Following destruction of soft and osseous tissues.

Class 2. Traumatic, central and cerebrospinal.
Class 3. Peripheral, inflammatory or neoplastic (intraorbital pathologic changes).
Class 4. Atonic ptosis.
Class 5. Neuromuscular disturbances (essentially myasthenic).
Class 6. Ptosis of cervical sympathetic involvement.
Class 7. Ptosis from third-nerve involvement.
- Peripheral, extracranial.
- Peripheral, intracranial and infranuclear, traumatic, neoplastic, and vascular.
- Nuclear and intranuclear, inflammatory, syphilitic, degenerative, neoplastic.

Class 8. The pseudo-Graefe syndrome.
Class 9. Ptosis of hysteria.

Fig. 47 (Spaeth). Ptosis correction through the use of a fascia-lata transplant, A, before, and B, after correction.

however, illustrate many of the possibilities. Following is a brief recapitulation of the classification just presented in detail.

Surgical correction

The correction of acquired or symptomatic ptosis, as it applies to class 1, may be technically more difficult than is that of congenital ptosis, but, generally speaking, the rules for guidance are simpler. A completely severed levator must be replaced, functionally, by utilizing the action of the occipito-frontalis, as with a Reese transplant (fig. 1). When both muscles are destroyed or seriously impaired, fascia-lata transplants may be substituted with almost equal functional satisfaction, but less so cosmetically (fig. 47). A partially sectioned levator can be repaired rather readily because the intact portions, when uncovered surgically, guide one to the edges of the traumatic section for reattachment (fig. 2). Cicatrices, when released, should be sutured in anatomic layers, one suture line to offset the one from the other, to permit maximum action of the remaining levator and orbicularis fibers (fig. 48). Cul-de-sac defects, after scar removal, must be

replaced with mucous-membrane grafts. Deformed tarsal plates can be removed at the time of a levator correction or adjustment. Socket reconstructions should spare the levator if it is still intact.

necessary estimated thereafter (fig. 8). It is important to remember, however, that this external approach to the levator tends to limit the total excursions of the lid even with ideal indications, and after most

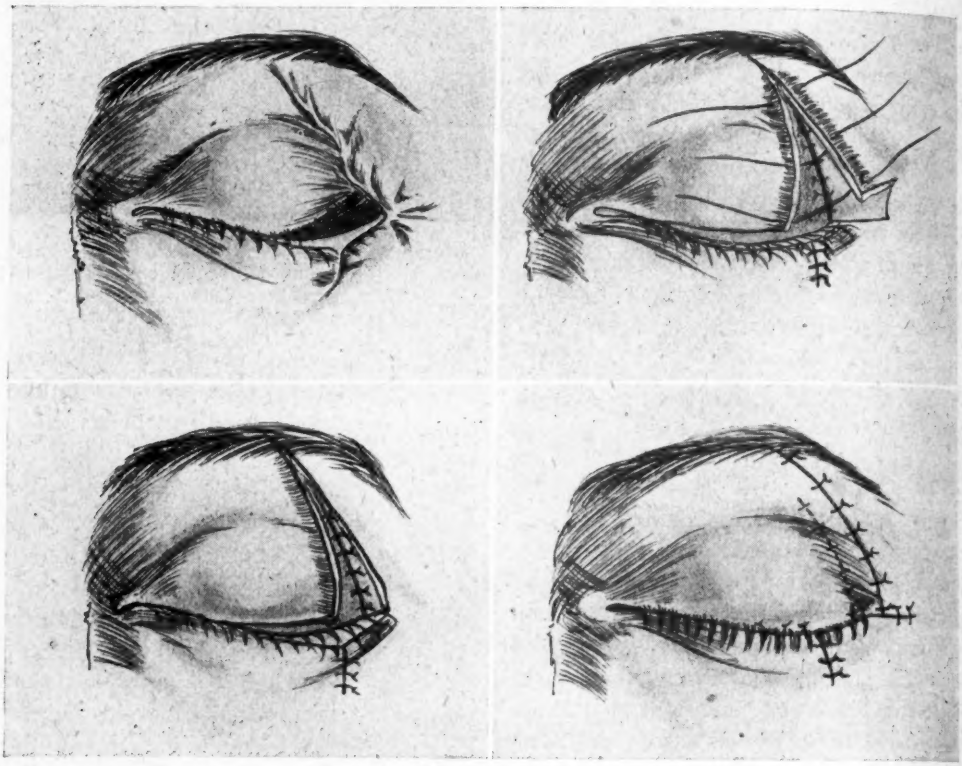

Fig. 48 (Spaeth). Scar resection, with offset suture lines. Correction for the ptosis of figure 3.

Fig. 49 (Spaeth). Ptosis correction following lid and cul-de-sac reconstruction by the use of the Hess technique.

In many of these cases wherein the levator can still be utilized, the external approach to this muscle, in the writer's experience, rather than the superior cul-de-sac approach, gives better end results. Adhesions and other accompanying deformities can be removed more readily, and the varying degrees of correction satisfactory surgical results. The Hess procedure has its optimum indications in the correction of ptosis connected with any type of lid reconstruction. Such lids tend to be thicker than normal, motility is poor, at the best, and orbicularis fibers are deficient. While this surgical procedure affects lid excursions by reason of

the adhesions formed, this fault is of least importance and least serious in these cases (fig. 49).

Correction for the ptosis of class 3 (peripheral, inflammatory, or neoplastic, intraorbital pathologic change) presupposes the removal, if possible, of the underlying orbital condition, and, following this recovery, correction is achieved by the rules just outlined.

Correction for the ptosis of class 4 (atonic ptosis) is largely a matter of levator resection combined with the resection of the atonic skin. In addition, the skin is to be quilted to the anterior surface of the tarsal plate to prevent a recurrence of the basic condition.

Class 5. The ptosis of myasthenia gravis is not a surgical condition. The removal of a thymic tumor will correct thymic myasthenia. Medical treatment for thyrotoxic ptosis is frequently of no avail and the patient will need an orbicularis transplant for correction. Ptosis, when accompanied by an acquired paralysis of upward gaze, cannot be corrected surgically. If that is done, the cornea will be exposed during sleep. Because of this lack of upward movement, an exposure keratitis will certainly develop, and vision may be lost in that eye. Such conditions must be corrected, during waking hours, by the use of crutch glasses (figs. 41B, 42, and 43).

Class 6. The ptosis of cervical sympathetic paralysis, when this is a permanent condition, is easily corrected by a levator advancement—using the transconjunctival route. The partial tarsectomy, usually performed for the congenital form of ptosis, is to be omitted to prevent overcorrection.

Classes 2 and 7 (ptosis from third-nerve involvement). These forms of ptosis, when permanent, are to be corrected by orbicularis or fascia-lata transplants; that is, by utilization of the action of the occipitofrontalis. All surgery, however, for the accompanying oculomotor paralyses should be completed first to minimize diplopia, in fact, to correct it before the lid itself is lifted. The rules for the accompanying paralytic squint are well known and need no mention here.

Class 8. The ptosis of the pseudo-Graefe syndrome is to be converted into a completely paralytic form of ptosis by a levator myectomy and tenotomy. This will correct that distressing variability present under different circumstances. Following this, the surgery for the accompanying ocular paralyses can be completed, and after that, the case brought to a functional recovery by an orbicularis transplant.

Class 9. The ptosis of hysteria has no surgical relationship.

Summary

A very brief classification is presented, convenient for the consideration of the various forms of acquired ptosis of the upper lid. The surgical needs for the correction of these cases are varied and exacting. Suggestions for the maximum correction of these dissimilar situations have been presented in that these procedures outlined have proved satisfactory in many instances. Recognized indications demand varied methods for correction. One form of surgical technique will best correct only one group of conditions. Attention to this exacting situation should give excellent results; its neglect will bring disappointments.

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OPHTHALMOLOGY IN PARIS DURING THE WAR

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Paris, France

During the war, under the German occupation, the practice and scientific activity of ophthalmology in Paris met obstacles of all sorts which hindered, but did not suppress, its practice. The progressive deterioration of transportation, the scarcity of lighting facilities, particularly of electricity, which eventually was almost completely lacking, the dispersal of a large number of our confrères that made it impossible for them to be present at the meetings of various scientific societies, all these unfortunate circumstances made any demonstration of our activity increasingly difficult. Besides, the societies could not obtain, for want of paper, the authorizations necessary for the publication of their journals, indispensable witness of their labors; moreover, it became less and less possible to hold the meetings as in normal times with any degree of regularity. The programs were always interesting and well attended, thanks to the devotion and commendable activity of their members.

Journals. The Archives d'Ophtalmologie and the Annales d'Oculistique for some time appeared in reduced size but finally were forced to suspend publication.

Hospital services were reduced by the loss of three of their best installations. The hospitals Beaujon, Lariboisière, and La Pitié were requisitioned by the occupying forces and their patients were redistributed throughout the remaining hospitals, these latter overcrowded by this additional influx of patients and by the reduction of medical personnel.

In spite of the material obstacles which sometimes seemed insurmountable and of the heavy, depressing atmosphere which weighed on everyone, ophthalmology in Paris succeeded in carrying on its daily task and in nourishing its scientific life with some degree of satisfaction. Proof of this lies in the long list, as yet incomplete, of communications, of which we shall give a résumé.

Ophthalmological Society of Paris. The activity of ophthalmologists was manifested here especially. Its meetings were somewhat irregularly held, since the beginning of the war. Unfortunately, the publication of its bulletin had to be suspended for want of the necessary authorization. The last issue carries the reports made from October to December, 1939. Later manuscripts have been preserved and will be published as soon as circumstances will permit. Choice among them is difficult to make and is somewhat arbitrary; but the great number of contributions makes this necessary. We offer our apologies to the authors and to the readers.

1940

ASPERILLOSIS OF THE CONJUNCTIVA

MR. A. HUDELO. Membranous film developed on the inner surface of the upper eyelid after an operation for chalazion. Surgical treatments did not prevent the pathologic growth from recurring. Treatment with an iodide only brought about recovery. It seemed to be an aspergillus, the type of which could not be identified.

A CASE OF HYSTERICAL AMBLYOPIA

MESSRS. BAILLIART AND DE MORA pre-

* Ophthalmologist of the Hospitals of Paris. Because of transportation difficulties, the author has not been reached for a corrected proof.

sented the case of a young girl, aged 23 years, who without any objective sign suffered from considerable diminution of vision in both eyes. Her visual trouble began six months previously in the right eye, at which time it was considered due to a spasm of the central artery. The left eye was not affected until much later.

There exists a concentric narrowing of the visual field, yet the patient can get along very well. Variations in the field occur frequently. During the period of observation, a spasm of accommodation occurred which produced a mild degree of myopia.

The authors think that there is a basis of auto-suggestion, the origin of which is actually, perhaps, a spasm of the right central artery. This is a case of hysterical blindness from which a rapid cure can be expected.

Ocular circulatory modifications in two cases of congenital cyanosis

Mr. A. Dubois-Poulsen. Observation of two children with cardiac malformation from patent septa and narrowing of the pulmonary artery, showing cyanosis and clubbing of the fingers. Retinas were red, with dilated arteries and veins. Venous pressure was almost equal to the pressure of the central artery of the retina. Considerable capillary stasis could be detected. Retinal cyanosis was increased with each cardiac systole; with each attack of cyanosis, pressure of the arteries approached that of the retinal veins. Whatever explains the cyanosis of the retina also explains the cutaneous cyanosis. Venous dilatation is dependent on the degree of stenosis of the pulmonary artery. The absence or presence of arterial dilatation may perhaps be a diagnostic feature with regard to the nature of the cardiac malformation.

Severe infection of a globe prevented by extraction with an electromagnet of an intraocular metallic splinter

Messrs. Jean Sedan, Farnarier, Mastier, and Goulesque. A steel splinter was in the globe for about 48 hours, having penetrated deeply into the vitreous after perforating the cornea and the lens, causing a panophthalmitis. Extraction of the foreign body was followed by rapid resolution of the infection, which had threatened to be quite severe.

Messrs. Aubaret and Joseph had observed similar cases.

Diagnostic and therapeutic points of the fight against trachoma in the XVth zone, from September to December, 1939

Messrs. Jean Sedan, A. Koutseff, L. Jean, and R. Gazalis. The blacks of the A.O.F. have very little trachoma. North Africans are more affected, palpebral scars are present to a large extent, pannus tenuis is more frequent than pannus crassus. The Tonkinese and the Annamites have very little trachoma, but are especially affected with the common forms of conjunctivitis. Recruiting of foreigners introduces it especially among the Italians and the Spanish. The latter are more frequently affected than the former.

The patients have been treated by brisk rubbing of the eyelids with gauze soaked in a strong solution of tannic acid in glycerin and weak instillations of the same given between treatments.

Lutazol or G33 used as subconjunctival injections and orally has given in the experience of the authors excellent results. Florid granulations have reacted very slightly, but it is efficacious in lesser granulations, pannus tenuis, trachomatous keratitis, and supra infections.

Mr. Bailliart confirmed the worth of sulfonamide treatment in trachoma.

A MEASURE OF OPTICAL AND VESTIBULARY CHRONAXIAS IN A CASE OF HYSTERICAL AMAUROSIS

MR. GEORGE BOURGUIGNON. Optical and vestibulary chronaxias are notably increased in hysteria. This sign offers an important element for differentiation between hysteria and malingering, for, in malingerers, the reactions times are normal. When the malingerer refuses to recognize the presence of phosphenes, investigation of the vestibulary chronaxia is indicated. Theoretically, the changes of chronaxias in hysteria prove that hysterical patients are really ill.

OCULAR PROTECTION AGAINST WAR WOUNDS

MR. ROCHON-DUVIGNEAUD. Two methods have been proposed: an eyeshade which can be lowered in front of the helmet and in which are cut flat horizontal apertures; a laminated shutter offering protection throughout the extent of the visual field.

The latter method is preferable.

MYDRIATIC COLLYRIA FOR CLINICAL USE

MR. MAGITOT. The effect of atropine is slow and the cycloplegia that it produces is often a disadvantage. Better results can be obtained with a combination of a parasympathetic colyonic drug whose action is on the pupillary sphincter and a sympathetic mimetic drug which acts on the dilator. Adrenalin, ephedrine, benzedrine sulfate, and like medicaments can be used. The sympathetic mimetic drugs diminish amplitude of accommodation without suppressing it; in combination with atropine, they seem to shorten the duration of the cycloplegia. Mydriasis is more rapid and greater.

SUBCONJUNCTIVAL INJECTIONS OF ADRENALIN IN HYPERTENSIVE IRIDOCYCLITIS

MR. BAILLIART reported the harmlessness and the efficacy of these injections made into the limbus.

A CASE OF TUBERCULOUS PRIMARY INFECTION OF THE CONJUNCTIVA

MR. P. BAILLIART presented the case of a child, aged 12 years, who had been affected since September last with lesions characteristic of primary tuberculous infection of the palpebral conjunctiva. Six months after the onset of these lesions, ulceration was still visible. The softened petrous ganglion enclosed the tuberculous bacillus. The author discussed the possible relation between Parinaud's conjunctivitis and tuberculous conjunctivitis, and noted that the penetration of the bacillus through the conjunctiva does not add to the gravity of the infection either from a local or a general standpoint.

BILATERAL OPTIC NEURITIS WITH MENINGEAL REACTION OF UNKNOWN ETIOLOGY

MR. A. MAGITOT. Bilateral papillary edema with blindness, loss of superficial abdominal reflexes and 11.6 cells in the cerebrospinal fluid, without pyrexia. The author compared it with Harada's disease, but confessed his inability to determine an exact etiology.

PREDOMINANCE OF GONO-REACTIONS OVER POSITIVE WASSERMANN REACTIONS IN THE COURSE OF IRIDOCYLITIS

MR. DUBOIS-POULSEN. In 180 cases examined, 48 gono-reactions were positive, 127 negative, 5 doubtful, 13 Wassermann reactions were positive of which 2 were coincident with a positive gono-reaction. In conjunction with iridocyclitis, blennorrhagia is certainly more frequent than the classical statistics indicate.

Recovery of intraocular foreign bodies in the field by fortuitous means

Messrs. A. Dollfus, Troche, and Willemin have utilized in their specialty field hospital divers techniques to recover intraocular foreign bodies: (1) by a ring of silver wire (wire used by stomatologists) with a diameter the size of the globe, placed in the conjunctival cul-de-sacs or at the surface of the eyelids, following the shape of the globe; (2) by a contact glass, Comberg type, cut to a diameter of 13 mm., in the depth of which are tubes containing catgut or hair, on which four fine marks of lead were fixed by a drop of minium in order that the principal axes of the cornea might stand out; (3) by Velter's procedure, fixation of two pellets of lead on either side of the vertical diameter of the cornea; (4) for very small foreign bodies of the anterior segment, by radiography without shadow (Vogt's technique) on dental films. Some excellent radiograms of the globe and of the orbit have been obtained thus with the field radiograph apparatus of S. de S. and have made possible the extraction of numerous intraocular or orbital slivers.

A probable case of Harada's syndrome (bilateral iridocyclitis with meningeal syndrome)

Messrs. A. Dollfus, R. Garcin, J. Guillaume, and R. Troche. Observation of a patient, aged 28 years, hospitalized for severe frontal headaches accompanied by high fever, by a mild splenomegaly and by meningeal syndrome (20 lymphocytes per cubic millimeter in the cerebrospinal fluid), and by an obscuring of the right frontal sinus. Trepanation of the frontal sinus, which seemed free from lesions, did not bring about improvement of the patient's condition. During the following days, the appearance of a severe iridocyclytis of the right eye, with uveitis, prevented examination of the fundus. There were persistence of the meningeal syndrome, and of fever, the appearance of a bilateral Babinski's sign, and motor deficiency in the region of the right thigh. Lumbar puncture: 6 cells per cubic millimeter, Pandy and benzoin negative, Meinicke subpositive. The blood Wassermann reaction was negative. At the end of one month, a severe attack of the left eye occurred similar to that of the right eye, after which a slight improvement in that eye was noticed. The complete development of the infection could not be followed because the patient was evacuated to the rear after an observation period of two months.

The authors discussed the various differential diagnoses which could be brought up. An iridocyclitis secondary to an infected sinus cannot be considered because on exploration the sinus proved normal; syphilis, in spite of the Meinicke subpositive in the cerebrospinal fluid, can also be eliminated because of the evolutional character with temperature of this ocular and central-nervous-system attack, both acute and subacute; furthermore, nothing whatsoever had been found previously, the blood Wassermann reaction was negative and the Pandy like the colloidal benzoin was negative in the cerebrospinal fluid.

The hypothesis of an abnormal form of spirochetosis having been raised, a serodiagnostic test, made two months after the onset of the infection, proved negative. The diagnosis which seemed most likely was that of an atypical form of Harada's syndrome. Evidently neither chorioretinal detachment nor destruction had been observed, but these are very late phenomena; moreover, because of the intense vitreous disturbance, the retinal swelling, which perhaps existed already,

did not manifest itself. It is to be noted that the patient presented a cutaneous eruption similar to a versicolor pityriasis.

Angioneurotic edema of the eyelids and of the conjunctiva accompanied by retinal edema

Mr. René Nectoux reported a case of retinal edema occurring in a woman aged 33 years, during the course of an attack of Quincke's edema affecting the eyelids and the conjunctiva. He stressed the rarity of such a syndrome and described the edematous disturbance of the retina, characterized especially by an intense dilatation of the vessels, the caliber of the arteries being only a trifle smaller than that of the veins, with a very low local arterial pressure, in the neighborhood of the venous pressure. This ophthalmoscopic phase is comparable to that which the author was able to produce experimentally in a rabbit in the course of anaphylaxis.

A case of Mikulicz's syndrome compared to the disease of Besnier-Boeck-Schaumann

Messrs. Favory and Pluvinage presented the case of a young man exhibiting a typical Mikulicz's syndrome. Search for the usual etiologies—rhinopharyngeal infections, tuberculosis, syphilis, Hodgkin's disease—gave no result.

Nevertheless, since the radiograph of the thorax showed a micronodular picture of pseudogranulitis and the histologic section of a piece of the lacrimal gland showed typical epithelioid masses, a diagnosis of Besnier-Boeck-Schaumann's disease was considered.

It would be interesting to inquire into the cause in many cases of Mikulicz's syndrome where the etiology remains obscure.

Study of the changes of the central retinal artery during slow intravenous injections of acetylcholine

Mr. Voisin had been able, by this method, to inject up to 1 gm. of acetylcholine. He proved a lowering of the arterial retinal pressure minima, as well as a lowering of the arterial humoral pressure, a minimum dilatation of the central artery and its branches or a dilatation of the peripapillary arteriolae without changes of the central artery, so-called.

When the injection of acetylcholine was rapid, it produced a vasodilatation of the surface and of the main body without dilatation of the retinal arteries, which demonstrates well the independence of the peripheral and the retinal circulations.

Anatomic study of two cases of tumors of the optic nerve

Mr. Guy Offret. The first was an almost wholly gliomatous tumor, the second a glioma evolving on a congenital dysplasia of the nerve and of the optic meninges (neuro-perineural gliosis). The author stressed the necessity of a topographical examination of the sheaths horizontal to and beyond the tumor.

Report on intraocular foreign bodies

Mr. Prosper Veil. This work, studied for a long time, is a most complete exposition of the subject. Due to its completeness and complexity it is impossible to present an abstract. It must be read in its entirety.

Colobomatous malformation of the crystalline lens

Messrs. Velter and G. Offret had observed a case of this malformation in a boy, 11 years old, who came to be examined for an error in refraction. The length of the equatorial rim of the crystal-

line lens on the right side seemed to be notched to an unequal depth. The zonule and the ciliary processes were equally changed with regard to this atypical coloboma.

1941

Geometrical apractognosia in lesions of the occipital lobe

Messrs. J. Lhermitte and J. Mouzon, relying on their personal observations, demonstrated that vascular lesions which strike the peristriate area (field 18 of Brodinan) are accompanied by disturbances in recognition and identification of symbols along with the loss of constructive action.

Furthermore, to this syndrome is added alexia associated with loss of recognition of colors and paralysis of Balint's gaze. These syndromes can be combined with quadrant hemianopia, but visual loss plays no part at all in the genesis of geometric or symbolic apractognosia. Extramacular hemianopia, almost wholly calcarine, is not increased by the phenomena of apractognosia; these are evidence of the attack on the cortical zone which surrounds the "cortical retina."

Pseudo-accommodation in aphakics

Mr. Dudragne. Several hypotheses can be made on the origin of pseudo-accommodation in aphakics.

(1) It can be supposed that adjustment of the optic system is accomplished by a lengthening of the antero-posterior axis; this hypothesis is definitely abandoned; the globe would have to change shape to an excessive degree.

(2) It can be supposed that adjustment is made by a displacement of the corrective lens. This second hypothesis is demonstrated in practice and proves that numerous aphakics move their glass from the position for which it was intended.

(3) The tolerance of circles of diffusion on the retina by the cerebral interpreter system can be considered.

The author has, for purposes of research, brought a reading chart nearer to the eye until the patient can no longer read it. The amplitude of displacement of this chart (false distance of accommodation) has made possible the deduction by calculation of the size of the circle of diffusion on the retina.

Of the 23 cases examined, 14 were recognized as being a "false distance of accommodation" 15 to 16 cm.—that is to say, amplitudes of the order of 2.25 to 2.50 diopters (round numbers). In four cases the "false distance of accommodation" was only 5 cm.; in five other cases it was 20 cm.

By calculation and from his observations, the author evolves the tables which make it possible to choose the addition which will give the greatest "distances of false accommodation."

Determination of ascorbic acid in cataractous crystalline lenses

Mlle. Lasco. Determination of ascorbic acid has been tried on 60 crystalline lenses by Tiliemans's method. A notable diminution of the ascorbic acid has been found in all cases. The diminishing is more marked in the mature cataract (vision less than 1/10) where the proportion can be lowered to 0.005 mg. in the crystalline lens or 2.45 for 100 of fresh substance. It is equally more evident in the pathologic cataract than in the senile cataract and even more significant the older the patient. Traces of ascorbic acid are always present in spite of complete opacification or very advanced age.

Tetanus and foreign bodies of the cornea

Mr. F. Bourdier pointed out the absence of tetanus infection resulting from foreign bodies in the cornea; there exists only one positive observation, mentioned by Quentin at the Congress of the French Society of Ophthalmology in 1937, but it is clouded with suspicion, the first symptoms having appeared 16 days after the accident and the injured man, cared for at home by his family, was found to have come in contact with conditions such that the infection could have been the result of a later contamination.

To what could be attributed the antitetanic power of the cornea? The conditions of vitality of its tissues differ from those of other organs; the membrane, superficially, is avascular; its temperature is lower, the reactions of the epithelial cellules are affected in special circumstances.

In examining the various publications, one can look in vain for authentic examples of keratitic tetanus; given the immense number of foreign bodies of the cornea, one can say that they are not clinically generative of tetanus infection.

Experimentally, research has been undertaken at the Pasteur Institute in the laboratory of Dr. Dumas. The results of the first series of tests have been that in 24 hours the appearance of tetanus is determined by the injection of toxin (up to 100,000 units in the episclera, to 50,000 units in the vitreous and in the parenchyma of the cornea); on the other hand, the deposit of pure toxin on the corneas which induces a purely epithelial erosion is not followed by any systemic effect whatsoever.

The corneal epithelium is an insurmountable obstacle to the development of the bacillus as well as to the passage of the toxin into the general circulation. These clinical and experimental facts explain why superficial wounds of the cornea enjoy immunity with regard to tetanus.

Induced elevation of arterial tension in chronic glaucoma

Mlle. Lasco. Vasodilatation obtained by acetylcholine has, up till now, been the most widely used therapy in the treatment of glaucomatous optic atrophy with progressive narrowing of the visual field. Equally excellent results are obtained by raising the retinal arterial pressure with pressedrine.

Anesthesia of the sphenopalatine ganglion in lacrimation

Mr. Dubois-Poulsen. The sphenopalatine ganglion is situated in the nerve paths controlling secretion of the lacrimal gland. Its anesthesia lessens, therefore, lacrimation in general and suppresses lacrimation of reflex origin. This therapeutic measure is worth using to combat lacrimation without stenosis of the lacrimal paths for which the cause is unknown.

A case of loss of light reflex and of consensual reflex with conservation of macular vision following a fracture of the anterior portion of the skull

Messrs. Dollfus and Sorel. Observation of a child, 14 years old, who, following a fall, sustained multiple fractures of the limbs and a left frontal fracture. After a period of coma, the child showed a total loss of vision in the left eye with mydriasis and complete immobility of the pupil, save for a consensual reflex brought on by illumination of the normal right eye. Illumination of the left eye did not produce any consensual reflex in the right. There was present in addition, a left paralytic ptosis and a paralysis of all movement of the globe. The serious state

of the patient and the syndrome of the complete section of the optic nerve made surgical intervention inadvisable.

Three weeks later, the movements of the globe began to reappear along with a certain degree of vision. Two months later extrinsic motility was normal, visual acuity was equal to from 2 to 3/10; the visual field was narrowed concentrically to 10° around the point of fixation. The papilla was pale and atrophied. In spite of the return of macular vision, illumination of the weak eye induced no consensual reflex of the opposite iris. There could be noted, moreover, an Argyll Robertson pupil.

It seemed very likely that there was a compression by a hematoma lying in the sphenoidal opening and the optic canal. The authors stressed the presence of the Argyll Robertson pupil, the loss of consensual reflex, and the mode of recovery of the visual field which began with central vision when, according to the rule, it begins in the periphery after traumatism of the optic nerve.

1942

Intracranial compression of the optic nerve by arachnoiditis of abnormal nature

Messrs. Sourdille, David, and Legrand came upon papillary changes resembling those of thrombosis of the central vein. In the course of surgical intervention, they discovered profound changes in the disposition of the vessels in the chiasmatic region and in particular significant anomalies of the internal carotid resulting from arachnoidal strictures.

A case of cancer of the cavum. An attempt at histologic and clinical classification of malignant tumors of the cavum

Messrs. H. Tille and Y. Miroux. This is a discussion of a tumor of the cavum, cervical and ganglionic at its onset. Ocular signs were successively a retrobulbar attack of the optic nerve, progressive and continued paralysis of the external ocular motor nerve on the same side, associated with a partial attack of the right trigeminal.

Diagnosis was delayed by the appearance of rhinopharyngeal signs and of severe epistaxes necessitating the ligation of the external carotid. Posterior rhinoscopy under the levator of the membrane exposed an ulcerated, budding tumor.

The development has continued two years, and has been but slightly influenced by radiotherapy.

The author mentions the different clinical and anatomic forms of cancers of the opening of the cervical ganglia.

The majority of these tumors are of a *sarcomatous fibroblastic type.* Their point of departure is lateral or tubular. The anterior-choanoid form develops like a nasopharyngeal fibroma.

Epithelioma arises after the fortieth year. Its site is tubular or in the choana. It is an epithelioma of the malpighian body in corneal or basocellular globes.

Lymphocytoma is a cancer occurring in the young, taking as its point of origin the vault of the cavum. It is a classical amygdaline lymphocytoma. This tumor is often ganglionic at first.

Lympho-epithelioma is quite frequent, its metastases are osseous or visceral and grow rapidly. Death can also result from a bronchopneumonia, repeated hemorrhages, or a meningitis severe in its progressive destruction of the meningeal coating of the skull.

Note on surgical technique in exenteration of the orbit

Mr. H. Tille. After subperiosteal exenteration, the orbital visceral pedicle is sectioned by means of the tonsil or poly-

pus snare. This method gave protection in meningeal wounds.

BAND KERATITIS

MR. GUY OFFRET. Observation of band keratitis appearing in a woman aged 78 years. This observation presented two peculiarities: an iridic change and lesions associated with the conjunctiva. The author believes that the origin of the disturbance is neural, which would explain the location on the horizontal meridian of the cornea and the disposition of the lesions in the anterior layers.

PARALYSES OF ACCOMMODATION DUE TO BOTULISM

MESSRS. M. A. DOLLFUS, JULIEN MARIE, AND MASURE reported six cases of botulism in which the diagnosis was established by ophthalmologic examinations, the principal symptom having been a paralysis of bilateral accommodation. In one case it seemed to be almost wholly an accommodative paralysis with only a paresis of the levator; in another there was complete internal ophthalmoplegia; the other cases were characterized by a pupillary diminution without paralysis of the extrinsic motility of the globe. No other muscular paralysis has been demonstrated, and notably no paralysis of the membrane of the palate. On the other hand, the patients evinced significant digestive disturbances. Ocular disturbances appeared very rapidly after ingestion of the toxic food (preserved beefsteak and poorly cooked, raw ham). Six cases were cured in a few weeks without complications after serotherapeutic treatment or by antitoxin and even without treatment in two cases. On the other hand a guest of one of the patients who had consumed a greater quantity of the toxic food died in a few days without any diagnosis of botulism being made and this could not be established other than in retrospect.

A PECULIAR ASPECT OF PUNCTATE RETINOPATHY

MESSRS. PRELAT AND P. DUMONT presented a patient whose fundus revealed a peculiar aspect of punctate retinopathy localized unilaterally without change in visual acuity.

The authors pose the question of the cholesterine nature of the punctata; one determination, made at the onset of the disturbances noted, had revealed in effect a significant hypercholesterolemia.

A CASE OF VACCINAL KERATITIS

MR. R. NECTOUX. Vaccinal keratitis first appeared as a mild ulceration dendritic in character, then was followed by an infiltration of the corneal lamina of disciform keratitis. The author emphasized the analogy of the lesions with herpes.

TRABECULAR NETWORK OF THE CORNEA

MR. G. OFFRET made a new observation on the trabecular network developed on the posterior surface of the cornea. Absence of serious sequelae of anterior segmentation does not permit this case to be considered as a late evidence of an exudative inflammation of the walls of the anterior chamber. It seems more likely to be a growth of endothelium detached in the course of a process of interstitial keratitis, such as is always found in the origin of these conditions.

A CASE OF BLINDNESS FROM SULFONAMIDES was presented by MR. MONBRUN.

OPHTHALMOLOGY, AUXILIARY OF MEDICINE (STATISTICAL ANALYSIS)

MR. JEAN GALLOIS. Once in three or four instances complete ocular examination for a commonplace reason, such as the choice of corrective lenses, demonstrates the presence of lesions or of ocular or general disturbances of which the pa-

tient is unaware. Only a doctor can determine this.

THE EYE AND AVIATION (LECTURE)

MR. MERCIER. From this very interesting lecture, it was determined that in the piloting of modern aircraft complete perfection in all modes of vision is indispensable.

From physiologic considerations with regard to the sense of sight and the exigencies of aviation, the author elicited the conditions of visual aptitude requisite for flying personnel. He stressed the necessity of very exact examinations for visual acuity under variable lighting, but always exactly measured, for verification of peripheral vision and binocular vision. Then he enumerated the visual consequences of physical conditions under which the aviator flies and works: influence of speed, of cold, of altitude, of radiations, and of intoxication. From these examples he drew conclusions as to the value of the different phases of the examination and the influence that it could have in classifying pilots physiologically, according to the type of activity required of them.

A CASE OF STILLING'S SYNDROME

MESSRS. PRELAT AND DUPUY-DUTEMPS. Congenital absence of abduction with absence of deviation resulting from strabismus in the direct gaze and conservation of normal visual acuity in the affected eye. The prism of de Graefe permits correct binocular vision in the front position, the diploscope indicating that there is simultaneous vision.

Stereoscopic fusion, on the other hand, is nonexistent.

PRESENTATION OF A CAPSULAR FORCEPS (MODEL OF DR. FOURRIÈRE)

MR. BAILLIART. This is a modification of the forceps of Elschnig.

A NEW METHOD OF CONJUNCTIVAL SUTURE BY A. ROLLIN

MR. BAILLIART demonstrated the whipstich without knots.

AVASCULAR RETINA FOLLOWING HEMORRHAGIC GLAUCOMA

MR. BÉGUÉ. A curious observation in which the only detail visible with the ophthalmoscope was the papilla, all retinal vascularization seeming to have disappeared.

CORNEAL LESIONS IN THE COURSE OF OCULAR HERPES ZOSTER AT THE ONSET

MR. RÉNÉ NECTOUX. The lesions had evolved toward the depth, following three phases: epithelial, parenchymatous, endothelial. The author noted the analogy with vaccine and herpes and the fact that the primary localization of the zosterian infection on the cornea is not always parenchymatous.

MONOCULAR DEPTH VISION

MR. J. PLICQUE. The superimposing on the same retina of two conjugate images which constitute a stereoscopic group tends to produce a depth perception of the object represented (a fact indicated earlier by Quidor and Herubel). The stereogenetic effect is neither regular nor constant; it is equally obtained by the imperfect superimposition of any two similar images whatsoever. Observations lead to consideration of the most pronounced of the images as most nearly approximating it.

These experiments do not authorize a rejection of the classical concepts concerning depth perception with its binocular component, specific sensation, and its accessory subjective component, linked especially to memory of shapes, colors, and contrasts presented by customary things. They do permit, however, to be demon-

strated that the physiologic neutralization, necessary to binocular vision without diplopia of objects in relief, is not a purely passive phenomenon. Habitual association of depth vision and of neutralization would create an elastic reversible link between the two phenomena, the accidental appearance of the neutralization sufficing in its turn to orient our visual perceptions toward the calling of three-dimensional objects.

A MODIFICATION IN THE PROCEDURE OF POULARD IN THE SURGICAL CURE OF SPASMODIC ENTROPION

This was reported by MR. JEAN VOISIN.

MALIGNANT EXOPHTHALMIA IN BASEDOW'S DISEASE

MESSRS. H. WELTI AND G. OFFRET, in connection with a characteristic observation, indicated the symptoms of malignant exophthalmia in Basedow's disease. The attack on visual function by disturbance of the sensory conduction had the appearance of a true manifestation of this exophthalmia. A single efficacious treatment can combat this formidable complication; decompressive trepanation of the orbit by a personal technique.

EPITHELIAL PUNCTATE KERATITIS WITH RELAPSES, IMPROVED BY CERVICAL NOVOCAINIZATION

MR. G. OFFRET. A 27-year-old woman had been troubled for almost a year by a stubborn bilateral punctate epithelial keratitis. Anesthetic infiltration only of the carotid plexus brought about an end of the disturbance, which reappeared at the end of four to five weeks. After several novocainizations, the keratitis began to disappear.

TRANSITORY MYOPIA IN THE COURSE OF QUINCKE'S EDEMA, PALPEBRAL AT THE ONSET

MR. S. VOISIN. Association of a transitory myopia and a facial Quincke's edema. The following pathogenic hypotheses were considered: imbibition of the ciliary body, rupture of the osmotic equilibrium of the crystalline lens, increase of the indices of refraction of the ocular media. The myopic state was independent of all active accommodative mechanism.

A CASE OF OPTO-CHIASMATIC ARACHNOIDITIS OPERATED ON AND CURED

MESSRS. CHAPPÉ AND DAVID made this report.

NEW TECHNIQUE IN THE REMOVAL OF TUMORS OF THE POSTERIOR POLE OF THE ORBIT

MESSRS. GUILLAUME AND DOLLFUS demonstrated this procedure.

GRAY ATROPHY OF THE PAPILLAE OF AN INFANT

MR. G. OFFRET. Presentation of a four-months-old baby, born blind. The light reflex was very slow, the pupils were abnormally large; in the fundi the papillae were gray. This lesion corresponds in all likelihood to the affection described by Beauvieux under the name of "pseudo-optic atrophy of the newborn" and for which the general prognosis is favorable.

SOME LITTLE-KNOWN OCULAR MANIFESTATIONS IN BASEDOW'S DISEASE

MESSR. H. WELTI AND G. OFFRET, in connection with unpublished observations, described some phases of ocular complications, scarcely classic, in those having Basedow's disease: accommodative difficulties, spasmodic tearing, Charlin's syndrome, anesthesia of the cornea,

neuro-paralytic keratitis, depilation of eyelashes and eyebrows. The pathogenesis of these various manifestations is not unique. The general neuro-vegetative irregularity of the disease finds its particular expression in the visual apparatus by the symptoms which have just been named.

1943

Intraocular sarcoma evolving for 34 years

Mr. E. Joseph. In this patient an intraocular sarcoma was diagnosed for the first time in 1908 by Dr. Chevallereau. In January, 1942, an enucleation, performed because of a particularly painful attack, revealed a sarcoma diffused in the orbit, and was then followed by a subperiosteal exenteration of the orbit. For one year the patient has shown no sign of local recurrence nor of metastasis.

A case of recurring opto-chiasmatic arachnoiditis

Messrs. J. M. Guillaume and E. Joseph. This deals with a patient who showed loss of vision in June, 1941; visual acuity in December was 1/100 with the right eye and 1/10 with the left when she was operated on for an opto-chiasmatic arachnoiditis. Forty-eight hours after the operation visual acuity was restored to normal in each eye. In September, 1942, there was the beginning of a new loss of vision; in November it was reduced to perception of hand movements in the right and to 1/10 in the left eye, with a bitemporal hemianopia. On the 1st of December vision O.D. was 0, with loss of photomotor reflex and O.S. was perception of hand movements in the nasal field. On December 7, 1942, another intervention in the opto-chiasmatic region was made in order to remove a sub-chiasmatic arachnoid cyst. Forty-eight hours later vision was normal in each eye, and on December 14, 1942, it was noted that vision O.U. was 10/10; the visual fields were normal. The fundi were normal throughout all the course of the infection. The authors stress the difficulty they encounter in finding a satisfactory physiopathologic explanation of the evolution of this attack on the optic nerve; slow loss of vision for several months, complete suppression for 15 days of light perception, complete and rapid cure after intervention, all without change in the ophthalmoscopic aspect.

Syndrome of Groenblad and Strandberg. Elastic pseudo-xanthoma with angioid streaks in a diabetic

Messrs. L. Guillaumat and P. Hallot-Boyer presented a patient suffering from this curious affection whose cutaneous lesions Darier described in 1896, the coexistence with angioid streaks having been reported only in 1929 by Groenblad and Strandberg. In the present case a great diminution of vision, especially noticeable in the left eye, was explained by exudative, hemorrhagic, and pigmentary lesions of the two macular regions. Equally in the right eye and in the left the papilla was surrounded by an irregular slate-gray ring from which spread jagged streaks, undercrossing the vessels and disappearing in the region of the equator.

Personal and hereditary history of this patient revealed nothing pathologic. General investigation disclosed only a beginning menopause and a strong hyperglycemia without acidosis or glycosuria. The establishment of an antidiabetic routine led to modification of the macular lesions of the fundus, rapid disappearance of the hemorrhagic clots and sufficiently good recovery of visual acuity. A picture of the angioid streaks showed no other change.

A cervical cutaneous biopsy had con-

firmed the existence of the elastic pseudoxanthoma of Darier with an overloading of the derma in elements colored with orcine: numerous elastic fibers, swollen and jagged, on the way to degeneration.

Can the age of a choroiditic lesion be evaluated

Mr. André Hudelo. Presentation of two patients who exhibited the characteristic spots of cicatricial choroiditis of the so-called "old" type (white patches more or less surrounded by pigment. Eight days before this definitive phase could be described (which is usually considered as arising in months or years) there was nothing on the choroid. It must be thought then in the presence of a spot of cicatricial choroiditis that its growth can arise in the preceding days.

The problem of the relationship between uveitides and certain infections of neurotropic viruses

Messrs. Guy Offret and Paul Bregeat, with regard to two original observations, posed the question of the relation between recurrent infections of the uvea and diseases of a neurotropic virus.

The course of certain uveitides is quite comparable to the development of disseminated scleroses or of encephalitides. It is not solely a question of coincidence but of morbid disturbances that, in all probability, unite the physio-pathologic links, which are quite limited.

Transitory myopia following sulfonamide therapy

Messrs. Monbrun and Jourdy. This is the case of a woman, 48 years old, who at the time of a pyodermitis underwent sulfonamide medication. For three consecutive days she took three tablets of 20 cg. of rubiazol. This treatment was interrupted for seven days. On the following day after the resumption of sulfonamide, there appeared a myopia of four diopters in both eyes. Vision, reduced to 2/10, was normal with glasses to correct the myopia. Treatment was stopped. The myopia disappeared in six days. This case is similar to nine others published in France and in other countries. It draws attention to a possible sensitization. In several of the cases published the myopia in effect appeared after the resumption of sulfonamide treatment interrupted for several days.

Blindness from bilateral optic atrophic neuritis following sulfonamide therapy

Mr. Monbrun reported the case of a woman whom he saw with Mr. Laedrich at the Necker Hospital. The case occurred in a 34-year-old woman affected with bronchiectasis. At the time of congestive pressure with fever, she had taken and well withstood sulfapyridine. A fresh supply of this medication having provoked nausea, the sulfonamide treatment was not continued. Three weeks later the patient was put on sulfathiazole. From the 2d of March to the 7th of March, 1942, she took 38 gm. of this. On the 7th of March, the last day of the treatment, the patient experienced a considerable loss of vision. An optic neuritis, retrobulbar at the onset (with a central scotoma for colors) developed within several weeks into a complete atrophy of the two optic nerves.

Seven days after the cessation of treatment, a blood test still showed 2.25 mg. percent of sulfonamide. It was thought for several days to be a polyneuritic disturbance purely sensory in form (tingling, analgesia with stinging, thermic anesthesia). This patient showed no anterior ocular defect. Renal function was normal. She had not taken during the preceding weeks any medication that could be considered suspect. It seems

necessary to inquire if the preliminary supply of sulfapyridine had not created a state of sensitization.

Sealing of cavities after enucleation with polyviol

Mr. Oudot (a war prisoner). Polyviol is a plastic substance very well tolerated by the tissues. Thiel, of Frankfort, advised its use to improve ocular prostheses. The ball, kept sterile in blood serum, after enucleation is fixed in the crater of the muscles which are sutured in front of it. If the necessary precautions are taken, the foreign body is well tolerated and the prosthesis perfect.

Some reflections on the clinical aspect of ocular tuberculosis

Mr. Bailliart, enumerating the works which have most recently appeared in France on the question, recounted the hesitation still encountered among many French ophthalmologists and phthisiologists in giving to ocular tuberculosis the importance and the extensiveness that is accorded to it elsewhere, and asked that this question take its place for general investigation.

Acute optic neuritis coupled with the ingestion of methyl alcohol

Messrs. J. Bollack and Jean Voisin reported a case of ingestion of methyl alcohol. On the sixth day, vision O.D. was 1/50; O.S. was 1 d. to 0.20; there was absolute central scotoma for green and red in the peripheral field. Visual disturbances progressed for the first 15 days to end in blindness in one eye and a considerable loss of vision in the other; changes in the visual field carried over at the same time to the central and the peripheral fields, this last attack in an asymmetrical manner but with predominance of loss on the nasal side. When the disturbances subsided, visual acuity improved to 1/50 and the peripheral visual field was restored while the central scotoma persisted; on the fortieth day, papillary discoloration became evident. The authors pointed out the numerous cases in the foreign literature and stressed the prophylactic measures that must be taken to avoid an increase in such poisonings from methyl alcohol.

Two observations of serious hemorrhages after chalazion operation

Messrs. Coutela and Morax indicated a treatment which stopped hemorrhage instantly; curettement of the operative cavity.

A case of blindness after ingestion of methyl alcohol

Messrs. Bollack and Voisin made this report.

Two cases of intoxication from ingestion of methyl alcohol with serious visual disturbances

Messrs. Prelat, Pierre Dupuy-Dutemps, and Ardouin. The authors followed two patients who 48 hours after the absorption of a massive dose of methyl alcohol definitely became blind. The lesions of the fundus were manifest at first under the aspect of a bilateral papillary stasis which rapidly evolved into an optic atrophy.

Palpebral dermoid cyst assuming the clinical aspect of a chalazion

Mr. Maussion. Removal of a palpebral tumor assuming the clinical aspect of a chalazion, but which had recurred rapidly following the first intervention, showed that it was a question of extensive palpebral lesions. Anatomic-pathologic investigation: dermoid cyst.

Diagnosis was made of an adenoma or a meibomian epithelioma.

Slow appearance of hemorrhage following extraction of a chalazion

Mr. Maussion. Massive hemorrhage appearing at the operative scar after exeresis of a chalazion, slow at its onset; fifth day. Blood test revealed a very high clotting time. It seemed to be an acquired hemophilia of recent date.

The relative frequence of these hemorrhages in the course of removal of chalazions was discussed.

A new case of myopia from sulfonamides

Mr. Pierre Desvignes made this report.

Prepapillary drusen (presentation of a patient and of color photographs)

Mr. Laignier presented a case of prepapillary drusen covering a surface equal to about 15 papillae. He thought it to be congenital in aspect. Although the papilla and the chorioretina were normal, he hesitated to attest to their perfect soundness, only the future would determine whether the changes habitually noted would occur. The retina which covered the hyaline verrucosity, at least at its margins, although transparent and seemingly separated from its pigmentary layer, was still capable of transmitting light stimuli.

Ophthalmoscopic photography in color in a case of probable hyaline degeneration of the pigmentary epithelium

Mr. H. Tille. Color photography of the fundus made it possible in this case to determine the vascular and retinal topography, and the topography of the hyaline mass itself in the pigmentary epithelium of the retina.

Optic atrophy from an obliterating retinal syphilitic angiitis in a child

Mr. G. Offret. Presentation of a subject, aged eight years, who became blind in six months. Examination of the fundus showed in both eyes an optic atrophy with clearly defined edges. The retinal vessels (arteries and veins) were almost all transformed into thin white lines. Furthermore, several patches of bilateral disseminated chorioretinitis could be seen. Treatment had no effect on these lesions manifestly cicatricial.

Intoxication from methyl alcohol and optic atrophy with destructive development

Mr. R. Perrin (Lyon). Observations in which the author reported three cases of complete and definitive blindness from the absorption of "lozenges" with a methyl-alcohol base.

Two cases of intoxication from methyl alcohol

Messrs. Kalt, L. Guillaumat and M. Moulin presented two cases of bilateral papillitis following the ingestion of methyl alcohol. In the two observations visual disturbances appeared three or four days after the intoxication: amaurosis of one eye and mere light perception in the other, with bilateral loss of light reflex. Pupillary reflexes progressively reappeared while the vision improved; at the end of one month it was about 9/10 on one side and 1/50 on the other because of a central scotoma, the peripheral visual field being relatively preserved. During this time the papilla lost color at the same time that the edema disappeared.

Purely symptomatic, the treatment consisted of injections of lukewarm novocaine retrobulbarly, of acetylcholine-papaverine, and of vitamin B.

Treatment with glycocoll in two cases of paralysis of accommodation of diphtheritic origin

Mr. R. Nectoux. The encouraging results obtained by various experimenters in the course of treatment of myopathies have suggested to the author the utilization of glycocoll in treament of certain affections of the ciliary muscle, accommodative asthenopia, paralysis of accommodation. He reported two observations of paralysis of accommodation from an isolated diphtheria in which a cure was obtained rapidly and indisputably by glycocoll alone.

Ophthalmoscopic photography in color of a case of amblyopia from methyl alcohol

Mr. H. Tille. It makes possible the localization of peripapillomacular edema in the cerebral layers of the retina, in conformity with the theory of Dr. Dupuy-Dutemps of a primary attack of ganglion cells. Discussion of the existence of appearances in photographs unobservable in ordinary ophthalmoscopy or "novae" ophthalmoscopic photography.

Action of nicotinic acid in a case of ocular hypertension

Mr. J. Gallois reported his recent research in the medical treatment of chronic glaucoma; he believes that he has evolved the principle that a vasodilator substance can have a favorable action on ocular tension, on visual acuity, and on the visual field at the same time, but on the condition that this action is exercised on the capillaries rather than on the arterioles and that this action can be restricted. The test that he made with ingested nicotinic acid shows that at the same time that the cephalic vasodilatation is elective, a significant lowering of ocular tension can be recorded with, in one case, an improvement in visual acuity.

The quarter of a diopter

Mr. J. Gallois noted that the correction of an isolated astigmatism of one quarter of a diopter can be the sole therapeutic means of completely ending a subjective painful syndrome of accommodative asthenopia, with general reservation, in certain cases of organic deficiency, among which he has already reported with Mr. Ch. Flandin the presence of angiohypotonia.

Well-advanced retinal arteriosclerosis: subsequent death from meningeal hemorrhage

Mr. J. Gallois pointed out the case of a man, 37 years old, with a reputed vascular heredity; first examination, performed for the correction of a very mild hypermetropia, showed nothing abnormal to a layman; examination of the fundus, that only a doctor could make, brought out the assumption of the presence of parietal lesions, vascular rather than general, which was actually the case; from these lesions the patient died at the age of 45 years.

The presence of these latent lesions, that only the examination of the fundus revealed, is much more frequent than is believed; ophthalmologic examination can disclose them at the time of consultation for an apparently minor cause and particularly when selecting corrective lenses.

Three cases of inclusion from eserine in oil in the anterior chamber after recent cataract operations

Messrs. Merigot de Treigny and J. P. Joly reported three observations of inclusion from eserine in oil in subjects operated on uneventfully, whether total extraction or extraction after discission. Of these three cases in only one was the foreign matter well tolerated; the others showed inflammatory incidents. Experimentation on animals showed reactions

analogous to those observed in man. The authors attribute the mechanism of the penetration and the incidents which follow to the poor quality of the excipient used.

ESSENTIAL PROGNOSIS IN GLIOMA OF THE RETINA

MR. J. BRUNEAU reported 74 observations histologically controlled, allowing a ratio of 26.5 per 100 decs. He estimates that the age of the child is not of much value from the point of view of prognosis, which is influenced rather by the earliness of the enucleation. A delay of three years seems sufficient to consider the cure as assured from the standpoint of the enucleated eye. He does not seem favorable toward an accompanying treatment by irradiation.

CHIASMATIC SYNDROME IN THE COURSE OF A CRANIO-PHARYNGIOMA. POSTOPERATIVE DEVELOPMENT

MESSRS. PRIEUR AND PUECH reported on this subject.

SIX CASES OF BOTULISM WITH OCULAR MANIFESTATIONS

MESSRS. DOLLFUS, JULEIN MARIE, AND MAZURE report six observations characteristic of botulism with ocular manifestations. They stressed the signs which make diagnosis possible: paralysis of accommodation, even though without other attack on the ocular musculature, and previous digestive disturbance (consumption of preserved or stale foods).

A CASE OF BOTULISM AMBULATORY IN FORM

MESSRS. VOISIN AND MAISON have noted a mild case of botulism whose manifestations (accommodative paralysis, paresis of the membrane, and dryness of the mouth) appeared in three days after a suspect meal followed by diarrhea for 48 hours. A right facial paresis was also present. Cure in one month after treatment with antitoxin and antibotulinic serum.

A CASE OF GLIOMA OF THE RETINA TREATED AND CURED BY X RAYS

MESSRS. BÉGUÉ, LE GOFF, AND A. LEHMANN. Observation of a five-year-old child whose eye was enucleated because of glioma of the retina, which was verified histologically. Involvement of the other eye three months later. Since the parents refused enucleation, X-ray therapy was given according to an unpublished technique. For four years the healing has been sustained; only one spot of chorioretinitis is present in the fundus; the child seems to have good vision.

A CASE OF TRANSITORY MYOPIA FROM THE ABSORPTION OF SULFONAMIDE IN WEAK DOSAGE

MESSRS. NECTOUX AND DANSAERT. New observation of myopia from a sulfonamide. The interesting fact in this case lies in the absence of sensitization by previous dosage of the medication.

METASTATIC CARCINOMA OF THE CHOROID TREATED BY RADIOTHERAPY; LOCAL HEALING

MESSRS. J. VOISIN, MALLET, CL. BOUDON, AND LECAMUS. A 53-year-old woman, operated on for a cancer of the breast in 1940, underwent an enucleation of the left eye in December, 1942, for a metastatic choroidal tumor. In January, 1943, she showed loss of vision with the right eye: it seemed to be a right choroidal metastasis at its onset. Treatment with radiotherapy reaching 25.00r per treatment to 150r brought about local healing. In 14 days there was regression of the protuberance, in two months return of normal vision. In the fundus the slightly elevated subpapillary area was thin and had a grayish tinge. Roentgen therapy was,

therefore, able to change the visual prognosis in carcinomatous metastasis of the choroid.

A CASE OF MYOPIA OF SIX DIOPTERS FROM ABSORPTION OF SIDENAN

MR. MERIGOT DE TREIGNY. In this observation myopia was due to a spasm of accommodation (reaction favorable to atropine). The incident seems to have been released by a true sensitization.

A CASE OF BOTULISM WITH OCULAR COMPLICATIONS

MESSRS. BARGY AND HUSSET discussed such a case.

BOTULISM

Lecture given by PROFESSOR LEGROUX of the Pasteur Institute, who drew his invaluable teachings from all the observations of botulism recently published.

There are mild, ambulatory forms of toxic infection; beginning with intestinal discomfort, general malaise, headaches, they result in a few hours in a lowering of visual acuity for near (and for distance in the hypermetropic) to an impossibility to read, which indicates paralysis of accommodation, since a convex glass immediately reëstablishes vision. The pupil and its reflexes are usually not affected, although other paralyses of the cranial nerves can be seen. The mouth is dry, and constipation customary. Within several days by the use of specific sera or of antitoxin these disturbances improve and disappear.

There are, unfortunately, some cases with more severe, even fatal, outcome following ingestion of massive quantities of toxin: digestive and visual troubles are early and severe; ptosis and mydriasis are expressed in a diffuse attack of the neuraxis. The general condition grows rapidly worse and death results in a few days.

In all these observations a group of symptoms makes it possible to establish the botulinic origin of the paralysis of accommodation. These are: absence of attack on the membrane of the palate, association of digestive disturbances; constipation, dryness of the mouth, offensiveness of the breath, dysphagia.

Investigation ought especially to seek out the source of the toxic product: preserved meat (pork especially) or leguminous vegetables (peas, green beans).

Strictly anaerobic, the botulinus bacillus is developed in preserved foods badly prepared and badly sterilized. It is often present in hams insufficiently salted and smoked, but it does not follow that the whole piece is contaminated; the infected portions, lying in the vicinity of the bone or extending along the aponeuroses, have a grayish appearance and are riddled with holes. Salt added to lard is bacteriostatic, but not antiseptic. The botulinus spore is resistant to heat only in a fatty medium; in an aqueous medium it succumbs at 67°C.

This explains the frequency of the intoxications following consumption of preserved pork and goose (a meat very high in fat content).

Too many precautions in preparing foods for the family cannot be taken; the old traditional rules are sure and we will do well not to discard them: do not kill for preserving between Easter and All Saints' day; divide the work, so that two different persons prepare the meat proper and the entrails: smoke ham a long time so that the tar-products have time to penetrate it deeply: heat preserved foods a long time, so that a sterilization temperature can reach to the center of the piece.

As to the difference in preserved foods wherein certain portions remain edible along with other portions which are infected, the preserving liquids of the legumes, green beans, spinach, are toxic

as a whole: on opening containers of peas which have been infected, there sometimes arises an odor of syringa or acacia which ought to arouse suspicion. Tomatoes, on the other hand, are never botuligenic.

It must be realized that suspected preserved foods can be eaten, but only immediately after they have been warmed to 100°C., a temperature which destroys the toxic agents.

Biologic characteristics make it possible to define two types of botulinus bacilli: A and B secrete two different toxins which do not confer reciprocal immunity; in our regions, it is always a question of Botulinus bacillus B, whose toxigenic power varies also according to the source.

Treatment of botulinic poisoning will employ serotherapy B in average doses: 20 c.c. intramuscular + 20 c.c. subcutaneously per day.

Antitoxin is useful in serious cases and in order to prevent the sequelae of poisoning.

1944

Action of nicotinic acid in a case of high myopia with choroidosis

Mr. Jean Gallois utilized the action of this capillary vaso-dilator, showing a high myopia complicated by a posterior staphyloma of average dimensions, and obtained very appreciable visual improvement.

Acquired deformation of the crystalline lens from an intraocular tumor

Mr. Felgines reported the observation of a patient affected with a melanotic sarcoma of the choroid in whom deformation of the crystalline lens by compression of this tumor was the only objective sign that explained the considerable lowering of visual acuity. This functional disturbance, which led the patient to come for consultation, thus permitted a diagnosis before the appearance of the classic signs of detachment or of hypertonia.

Prolonged spasm of the central retinal artery in a woman at the pre-menopause. Role of the endocrine glands in the genesis of arterial spasms

Mr. Koutseff, with regard to this observation, drew attention to the role that a polyglandular insufficiency can play in the genesis of these arterial spasms and to the action of hereditary syphilis and of hereditary tuberculosis in the origin of this insufficiency. Nevertheless, specific treatment does not generally act on hereditary syphilitic lesions of glandular cicatricial sclerosis.

Appearance of functional disturbances at the age of 35 years in a patient with congenital buphthalmos

Mr. Dubois-Poulsen studied the case of a patient, one of a family of four children, three of whom were suffering from infantile glaucoma. Buphthalmos began in his early childhood without affecting visual function. Only when he reached 35 years did the papillary excavation appear and also diminished vision, although tension seemingly did not rise above 30 mm. Operations and medical treatment proved ineffectual in stopping the progress of the malady.

Notes on the actual recurrence of a spasm of accommodation in children

Mr. Réné Nectoux had for some time noticed the recurrence of cases of "spasmodic myopia" observed in children. Usually of mild degree, it reaches or surpasses on rare occasions two diopters; most often, but not always, bilaterally. Suitably treated, it disappears, generally

speaking, quite rapidly. Treatment requires above all the instillation of atropine for several days consecutively; then optic correction can be prescribed. General treatment plays an essential part, since it aims at reëstablishing equilibrium of a deficient dietary regime, cause of the visual trouble. The lack that can most particularly be incriminated bears on mineral salts, vitamins, aminic acids, and glucose. It is, therefore, to a polyvalent therapeutic that we must have recourse. Calcium gluconate will always be prescribed; lack of calcium, very frequently observed in a normal period, is accordingly influenced by dietary limitations.

PENICILLIN IN SEVERAL CASES OF OCULAR INFECTION

MR. DUBOIS-POULSEN'S experiments with penicillin in several patients led him to conclude that the effect of this product on the staphylococcus is remarkable. Clinically the sulfonamides cannot approach its constancy and its rapidity of action on this microbe. In ocular pneumococci, penicillin seemed to act more efficaciously and brought about cures in those cases wherein the sulfonamides were ineffectual, for example in infectious ulcers of the cornea. Sulfonamides gave very unreliable results in panophthalmias when the causal agent was not streptococcus. The results from penicillin were more brilliant. The future will have to prove the respective indications for the use of the two products, which cannot fail to be beneficial when the task is completed.

TUBERCULOUS SCLEROSIS OF BOURNEVILLE (EPILOÏA) WITH RETINAL LESIONS

MESSRS. DEGOS, J. LEREBOULLET, AND G. RENARD presented a patient suffering from the tuberculous sclerosis of Bourneville, complete from the standpoint of symptomatology. This patient showed bilateral patchy lesions of the retina. Furthermore, in a short space of time there appeared a bilateral papillary stasis with syndrome of intracranial compression.

FOSTER-KENNEDY SYNDROME IS NOT ALWAYS A SIGN OF LOCALIZATION.

MESSRS. PUECH, DESVIGNE, AND DESCLAUX. Characterized by an optic atrophy on one side with a central scotoma, marked visual loss, and papillary stasis of the opposite side, the neuro-surgeons feel that this syndrome is characteristic of a stricture of the optic nerve on the side of the optic atrophy. But it is not always a question of a tumor situated near the constricted optic nerve, and there is a tendency to forget that the optic nerve can be constricted by remote tumors; several cases of this have been published. These authors report the observation of a patient presenting a Foster-Kennedy syndrome, in whom the constriction of the optic nerve was discovered by the dilatation of the third ventricle with blockage of the aqueduct of Sylvius, the whole following a process of arachnoiditis, as the ventriculograph, intervention, and autopsy proved.

INTRAOCULAR TOLERANCE TO SLIVERS OF ALUMINUM COMING FROM EXPLOSIVE BOMBS

MR. JEAN SEDAN reported the observation of four ocular patients wounded by explosive bombs who were perfectly able to tolerate fragments of aluminum intraocularly. These cases show that it is advisable to leave these slivers of aluminum in place, avoiding useless trauma of the globe, certainly less harmful than the present method.

A RARE VISUAL OCCURRENCE RESULTING FROM SULFONAMIDE THERAPY

MESSRS. LUCIEN LEGER AND GUY OF-

FRET observed in a 13-year-old child, who had undergone sulfonamide treatment for a pneumonia complicated by pneumococcus peritonitis, a sudden blindness which completely disappeared in seven days. Examination of the fundus was always negative; the light reflex was retained, and there was no mydriasis. Cerebrospinal fluid was normal. The authors discussed the mechanism of this blindness without conclusion: cortical blindness, process of optic neuritis.

TWO UNPUBLISHED OBSERVATIONS OF SERIOUS FORMS OF OPTIC NEURITIS FROM AN ICTEROHEMORRHAGIC SPIROCHETOSIS

MR. AURENCHE presented these two observations which had this in common that they both left serious neuritic sequelae, a fact which goes counter to the classically, accepted opinion on the benignity of the ocular complication from spirochetosis.

THESES PRESENTED BEFORE THE FACULTY OF MEDICINE OF PARIS

During this period of the war, the Faculty of Medicine maintained normal activity, although the number of students was continually decreasing. Courses and examinations followed their usual cycle and several theses on ophthalmology were presented, among which were:

ANDRÉ SENECHAL: CONTRIBUTION TO THE STUDY OF VISUAL TROUBLES FOLLOWING LOSS OF BLOOD. Paris, 1943

After a detailed clinical description, the author brings up the question of the origin of these visual troubles, the appearance of which, according to him, would be conditioned by three primary factors: a special region, a lesion or a local disturbance of the ocular apparatus, some releasing factor.

The special region is determined by an organic deficiency which can remain indeterminate, but in a large number of cases coincides either with an established hepatic insufficiency or with a noticeable disturbance of the functions of the liver. It would, then, be very interesting after such hemorrhages to investigate methodically the functional value of the liver.

But, in certain cases endocrine disturbances are encountered, among which the most notable and probably the most significant would be hormonal imbalance in connection with obesity.

Finally to mention one factor, sometimes associated with the preceding, there is a vago-sympathetic imbalance dependent on certain indications.

Local disturbances which seem to favor most the appearance of posthemorrhagic complications are: intraocular hypertension, a preëxisting lesion, a diminution of vascularization with spasm, a particular vulnerability of the sensory fibers.

The conclusive reason is really more complex than would appear on the surface. The hemorrhage seems to act not by the simple loss of a given quantity of oxygen, whose effects are known to be harmful and quasi-experimental, but by a more complex and deeper process; the possible action of heterogeneous substances accompanying a regeneration of blood, as witness the qualitative modifications of the blood. The visual apparatus is affected more often as the anemia is improved.

Every toxic substance—toxins secreted by gastric or duodenal ulcers, toxins from obesity, a superadded intoxication—is capable of engendering visual troubles, the substance having its harmful action increased along with the poor hepatic functioning.

DR. P. BREGEAT: CONTRIBUTION TO THE STUDY OF EARLY GLIOMAS OF THE OPTIC CHIASM. Paris, 1941.

This work, thoroughly documented, is based on the observation of 13 patients

whom the author was able to follow in the service of his chief, Prof. Clovis Vincent. These gliomas are rare tumors which arise in the young. Histologically benign, slow in development, loose or fibrous in structure, they are characterized by their Schwann-like aspect of which the oligodendrocytoma represents the purest type. Ophthalmologic symptoms are constant, particularly optic atrophy and disturbances in the visual field, but their modality of expression is variable. Symptoms of neurohypophysis are frequent, but at the same time few in number. Radiographic shadows are very frequent, but of unequal value. In the matter of glioma of the anterior optic pathway, pronounced dilatation of the optic foramen indicates an affection of the intracanalicular segment of the nerve; a gourd-shaped shadow indicates an attack on the intracranial segment. But it must be stated that the gourd-shaped shadow has less diagnostic value in this case than the dilatation of the optic foramen in the preceding case. Ventriculography permits at most only a diagnosis of neurosurgical localization. To sum up, no one sign alone is pathognomonic of a glioma of the chiasm; this explains the difficulty of its diagnosis.

There is a way of distinguishing two varieties of early glioma of the optic chiasm: (1) Clearcut cases which develop slowly in young children. The tumor infiltrates the anterior optic pathway, it follows its anatomic form, and breaks out at the third ventricle. (2) More frequent are the cases which change the shape of the chiasm, bloat it, have a tendency to invade the optic nerve and the third ventricle rapidly. It is in these forms that the disturbances of neurohypophysis often appear.

Diagnosis of early gliomas of the chiasm is an exceptional diagnosis, often an operative diagnosis. They are, in effect, generally confused with a tumor which frequently occurs in children: the craniopharyngioma.

Neurosurgery has practically no effect on a glioma of the chiasm itself. Although often of diagnostic help, it is only a palliative; in getting rid of the intracranial hypertension, so frequently present, it makes possible a successful outcome with irradiation treatments.

Dr. Alain Goere: Contribution to the study of bilateral traumatic paralyses of the sixth nerve. Paris, 1943.

Treating a subject already well known, the author has attempted to set forth with great clarity the characteristic principles of these paralyses and to examine thoroughly certain points in their history. They result quite often from violent traumas causing a bilateral compression of the skull. Nevertheless, there are some cases in which shock has borne upon a point somewhere on the skull and has been only very light.

The two essential symptoms are: bilateral convergent strabismus and diplopia, which cause functional impotence of the two external recti.

In the majority of cases, as Panas thought, these paralyses are accompanied by fractures of the two petrous portions of the temporal bone. The close anatomic relations presented by the nerve and the bone at this point, make it possible to understand easily the mechanism of these paralyses; it seems most often to be a direct attack on the nerve by an osseous fragment, more rarely a compression by hematoma, osseous callous, or focus of osteitis. Goere admits the possible nuclear origin of these paralyses, particularly following traumatisms which have brought about severe shock.

Prognosis is in general very poor when there is a fracture of the petrous portions of the temporal bone. It must, moreover,

be reserved for a long time, since it is possible for the lesions to be due to a constriction by hematoma, and in this case to regress. This pathogenesis occurs most often in the young child, who rarely sustains a fracture of the base of the skull. Consequently, prognosis will be better in his case than in that of an adult or aged person.

Surgical treatment alone can bring about improvement in the case of definitive bilateral paralyses. There should be a delay of about six months before surgical intervention is used. The author advises an advancement of the two external recti and, if necessary, a tenotomy of the two internal recti.

J. P. JOLY: MORPHOLOGY OF THE SENILE EYE. Paris, 1941.

The author of this thesis completes this chapter of ophthalmology by new knowledge, results of electric ophthalmoscopy and of biomicroscopy. The different parts of the eye do not age with the same rapidity, and the process of senility is expressed, according to the tissues, by various phenomena: sclerosis, cytologic changes, fatty or hyaline degenerations, proliferations of the conjunctiva, cellular atrophies. It is important to differentiate carefully between what arises simply from the physiology of old age and what is evidenced indubitably as pathologic in nature.

Proceeding step by step, organ by organ, Joly depicts successively the modifications of the adnexa, then the senile changes of the anterior and posterior segments of the globe.

In the paraorbital region, senile swelling of the upper lid contrasts with the adipose loss which invades other areas; and the wrinkles, the loss of eyebrows, the tendency to ectropion characterize the eyelids of the aged.

If the sclera becomes thick, the conjunctiva, on the other hand, shows evidence of increased laxity. Fragile, it tears under the forceps which grasp it in the course of ocular operations. These sclerosed vessels can break, giving rise to small hemorrhages visible under the microscope. The cornea shows one of the most classic signs associated with age: arcus senilis or gerontoxon. Many adults of from 35 to 50 years of age, however, often manifest this incompletely. Involving the whole cornea, it extends to the deeper rather than the superficial layers, and is noticed as a deposit of cholesterine. But more interesting still are the disturbances discoverable with the biomicroscope in the transparent senile cornea, on superficial examination. Verrucosities described by Hassal and Henle fill the posterior surface of the cornea. The endothelium loses its limpidness and colored lines are visible in the parenchyma. The depth of the anterior chamber is more often diminished rather than increased. Narrowed, the pupil does not lend itself well to ophthalmoscopic examination. It is the result of senile, iridic atrophy with progressive loss of pigment of the posterior epithelium. There is the same development in the ciliary body toward perivascular sclerosis with muscular atrophy. But the modifications of the crystalline lens especially invite attention. Internal dispersion increases, giving to the crystalline lens a grayish appearance which could be mistaken for a cataract without an examination by transillumination. At their extremity the branches of division of the sutures are bifurcated. The thickness of the cortex increases similarly to that of a nucleus.

According to the distinction, now classic since the report of Duverger and Velter, stationary, crystallinelike opacities must not be confused with a cataract, progressive opacification of the crystalline lens. Use of the slitlamp makes it

possible to determine all the changes that age adds to the previous affliction, to the nucleus and to the zones of discontinuity. Also, it sometimes leads to a lamellar dissociation, but the microscope does not seem to offer indisputable proof that the cataract according to the physiologic term could be attributed to senescence of the crystalline lens.

In the region of the posterior segment, explorable only after pupillary dilatation, the vitreous loses its transparency. A senile halo surrounds the papilla and obliterates its contours. Small yellowish spots, described by Nagel under the name of hyaline verrucosities of the vitreous layer of the choroid, are interspersed throughout the fundus; these are of no pathologic significance. On the other hand, the macula is sometimes the site of a true senile degeneration, result of circulatory insufficiency and lack of nutrition. The aspect of the vessels proves this: irregular, sinuous, sometimes sheathed with white.

In every way, so Joly concludes, these senile changes come on depending upon the individual, at a more or less advanced age, and certain elements of the globe age before others. Above all it is advisable not to consider as a pathologic lesion that which is only the prerogative, most often very tolerable, of age.

Such is the balance sheet of the ophthalmologic work and publications done during the German occupation of Paris. It is not complete, but such as could be determined, it suffices as a witness of the activity of ophthalmologists in Paris who in spite of the severity of the times have sustained their interest in work and in scientific research. Finally, it is fair to mention the participation of our provincial confrères who, struggling under difficulties, sometimes even greater, have brought forth interesting works gathered together with gratitude by the Parisian societies.

154, Boul. Hausmann (8).

TRAUMATIC OCULAR INJURIES IN SOLDIERS*

Preliminary study

Benjamin Rones, M.D., and Helenor Campbell Wilder
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This is a preliminary study of soldiers' eyes injured in combat and in training. The Army Institute of Pathology has received 399 eyes enucleated at army hospitals because of injuries sustained between the attack on Pearl Harbor (December 7, 1941) and D Day (June 6, 1944), the time we have chosen for the purpose of this paper. In later studies we shall deal with the eyes injured from D Day until the termination of the war, and in more detail, with various phases of injuries.

TABLE 1

Causes of ocular injuries

Wounded in action	56
Wounds received in training camps	
Explosions, accidental	
Land mines	41
Cartridges, dynamite, grenades, percussion caps, shrapnel, gunshot	92
Airplane, jeep, automobile, and motorcycle accidents	19
Nonexplosive penetrations	
Bayonet, rifle spring, etc.	14
Hammers, chisels, nails, wire and tools	48
Miscellaneous (glass, stone, wood, etc.)	42
Fights	30
Baseball and other sports	11
Injuries of unknown origin	46
Total	399

The patients were all soldiers who were in the 18- to 38-year age group. The lesions in 56 of this series were the result of battle wounds (14 percent), and in all these explosions were the injuring agents. In 256 cases the injuries were incurred in training for combat (64.2 percent), and included 133 due to high explosives. Personal fights occur in training camps as they do in civilian life and accounted for 30 injuries. Baseball and other sports were responsible for 11 cases, while the origin of 46 is unknown.

An analysis of the time interval elapsing between injury and enucleation is of interest both clinically and pathologically. The severely injured eyes were removed by necessity within the first few days. In the majority of cases, however, enucleation was delayed from two weeks to four months, while all surgical, physical, and chemical methods of therapy were utilized in the attempt to save the eye and salvage useful vision. To the pathologist this time interval is important, as it makes possible the study of the reparative processes in injured eyes at all stages.

TABLE 2

Time interval between injury and enucleation

Time After Injury	Number of Cases
Same day	40
2d day	15
3d day	12
4th day	9
5th day	9
6th day	6
7th day	21
2d week	48
3d week	30
4th week	13
2d month	62
3d month	27
4th month	26
5th month	18
6th month	10
6 months to 1 year	21
Over 1 year	3
Unknown	29
Total	399

* From the Army Institute of Pathology, Col. J. E. Ash, Director. Read before the New York Academy of Medicine, Section of Ophthalmology, February 19, 1945.

In this series there were 373 eyes with penetrating wounds. Laceration was extensive in 10 cases. The cornea was the site of penetration in 147, the sclera in 87, whereas a combined corneoscleral penetration was present in 94. In 35 the site of penetration was unspecified and could not be determined from examination of the globe.

Foreign bodies caused many of the penetrating wounds of the globe. Attempts to remove the foreign bodies were made whenever their presence was suspected. In this series there were 28 successful removals of intraocular foreign bodies, 7 being extracted on the day of injury. In 33 cases, however, the foreign bodies were nonmagnetic and could not be removed. On pathologic examination many foreign bodies were discovered that had not been suspected clinically, or else that were in eyes so disrupted that enucleation was imperative. These retained foreign bodies were metallic in 57 instances, whereas 22 were of a miscellany of nonmetallic substances. In 45 cases the nature of the foreign bodies has as yet remained undetermined.

TABLE 3

SITES OF PENETRATING WOUNDS

Cornea	147
Limbus (including cornea and sclera)	94
Sclera	87
Extensive laceration	10
Unspecified	35
Total	373

Operative attempts to save the eye were made in 86 cases. A simple repair of the wound without excision of tissue was done in 33 cases, whereas in 28 others, repair with excision of prolapsed tissue was carried out. Traumatic cataracts were extracted from 14 eyes. Secondary glaucoma required operation in 7 cases, and in 4 iridectomy was performed for various reasons.

TABLE 4

ATTEMPTS AT REMOVAL OF INTRAOCULAR FOREIGN BODIES

Outcome	Day of Operation	
Successful	Same	7
	2d	2
	3d	1
	4th	1
	7th	1
	9th	2
	18th	1
	Unspecified	13
	Total	28
Unsuccessful		33

Examination of the enucleated globes showed a wide variety both of tissue injury and of the mechanism of repair. The penetrating wounds resulted in prolapse and incarceration of all the intraocular structures, separately and in combinations. The commonest type of prolapse was that of the iris, with that of the combined iris and ciliary body next in frequency. Penetration of the posterior segment of the globe produced combined prolapse of the uvea, retina, and vitreous. Extensive evisceration of the contents of the globe was encountered in 48 eyes, and in 25 the lens was extruded through the site of injury. Detachments of the retina, some in combination with those of the uveal tract, were found in about one half of the 373 eyes with penetrating wounds. Intraocular hemorrhages were the commonest findings; they were seen in all the tissues, in various stages of resorption and organization. The most frequent single structural change was traumatic cataract, present in 190 eyes. Inflammatory changes were very common,

TABLE 5

OPERATIVE ATTEMPTS OTHER THAN FOR FOREIGN BODY

Simple repair—no excision	33
Repair with excision of prolapsed tissue	28
Removal of traumatic cataract	14
Operations to lower intraocular pressure	7
Iridectomy	4

TABLE 6

PENETRATING WOUNDS—PATHOLOGIC FINDINGS (373 EYES)

Prolapses	
Iris	74
Ciliary body	8
Combined iris and ciliary body	32
Combined viscera	20
Extensive evisceration	48
Lens extrusion	25
Detachments	
Retina	77
Uvea	15
Retina and uvea	76
Intraocular hemorrhage	290
Traumatic cataract	190
Inflammations	
Acute	66
Subacute	33
Chronic	145
Secondary glaucoma	25
Phthisis bulbi	44
Siderosis bulbi	3

being acute in 66 cases, subacute in 33, and chronic in 145. Secondary glaucoma was a complication in 25 eyes, and beginning and advanced phthisis bulbi in 44. It is noteworthy that of 57 cases in which retained metallic foreign bodies were found on sectioning the eyes, in only 3 was there histologic evidence of siderosis bulbi. Even more worthy of emphasis is that in this series of 373 penetrating wounds, there was not a single instance of sympathetic ophthalmia.

There were also in this series 26 eyes with nonpenetrating or contusion types of injury. Here also the commonest change was hemorrhage. Traumatic cataract was present in 10 cases, with detachment of the retina and uvea in 31 percent of the series, as compared to 45 percent in the penetrating injuries. It is apparent in the tables that phthisis bulbi was a more frequent sequel to penetrating injuries (12 percent), and secondary glaucoma to contusions (38 percent). Inflammatory changes were present in 66 percent of the penetrating injuries and in 50 percent of the contusions.

TABLE 7

CONTUSIONS—PATHOLOGIC FINDINGS (26 EYES)

Iridodialysis	3
Rupture of iris and filtration angle	2
Dislocated lens	1
Traumatic cataract	10
Intraocular hemorrhage	20
Anterior chamber	6
Detachments	
Retina	6
Uvea and retina	2
Inflammations	
Acute	2
Subacute	2
Chronic	9
Secondary glaucoma	10
Phthisis bulbi	2
Evulsion of optic nerve	1

This initial overall picture of ocular injuries in soldiers is simply a statistical report. Analysis, interpretation and clinical correlation will be attempted in the studies now under way. It is our purpose to study in detail the histologic reactions to intraocular foreign bodies, the types of injury sustained in nonpenetrating contusions, the mechanism of repair in the various ocular structures, the fate of hemorrhage in the eye, and late degenerative ocular changes following injury.

Again, we wish to call attention to the absence of sympathetic ophthalmia in these cases. Great credit is due the ophthalmologists of the Army Medical Corps who have handled so many cases so skillfully.

1610 Eye Street.

CHANGES AT THE MACULA DUE TO SOLAR RADIATION

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This paper presents seven cases of injury to the macula in individuals who have viewed an eclipse. The injuries were found in young, healthy men of the R.C.A.F. in the course of 1,000 routine eye examinations. In all cases the exposure to solar radiation had occurred several years previously, and the subjects now noted only minor abnormalities of vision.

Special methods of examination were required for the investigation of the very small central scotoma and the minute changes at the macula. The other findings were obtained by means of routine ophthalmologic techniques.

METHODS OF EXAMINATION

A. VISUAL FIELDS

The very small central scotoma was investigated by two methods, as follows:

(1) The tangent screen was used at from 2 to 5 meters. Plotting was done with a white test object of from 1 to 5 mm. If this failed to reveal the defect a blue test object was substituted. The patient's correction was worn over the eye to be tested while the other eye was covered. The examiner obtained fixation by placing four small white objects as if to mark the ends of a cross and asking the patient to fixate at the center of the cross. When the distance was 2 meters the fixation objects were first set 5 cm. apart. The scotoma was plotted roughly, and the fixation objects brought in close to the margins of the defect. The outline of the scotoma could then be traced accurately.

The main problem is to maintain steady fixation. Since central vision is defective, a single fixation object allows fixation to wander. However, when four objects are used and brought to the margin of the defect, fixation can be steady and the defect plotted accurately between them. A long working distance increases the size of the scotoma but decreases the steadiness of fixation.[1] However, in these cases the longer distances have seemed to give better results. When a constant defect cannot be found, it is probable that fixation has been sufficiently unsteady for a very small scotoma to appear to shift. In such a case the patient loses the test object for a moment and then sees it again without the examiner's being able to localize the visual defect at any one point.

(2) The tangent screen was used at from 2 to 4 meters, and a single white 5-mm. fixation object was placed at the middle of the lower part of the screen. A trial frame was set on the subject's face with a 20-diopter prism, base down, and a pinhole disc over the sound eye. The patient's correction was put over the eye to be tested. The examiner obtained fixation by requesting the patient to view the fixation object through the pinhole disc and prism with the sound eye. By this means the fixating eye saw a dim image of the fixation object displaced upwards. The subject was asked to look at the dim image, and this caused the injured eye to be aligned on a point above the fixation object. The region of this point was not visible to the fixating eye because of the pinhole disc. The projected fixation object was charted and the whole neighboring region investigated for a scotoma. Fixation was so steady that a small scotoma could easily be found and the borders accurately traced. This method could be employed when one eye was affected.

B. Ophthalmoscopic examination of the macula

The optics of the normal foveal reflex have been described by Friedenwald.[2] The macula is comparable to a concave mirror. Light from any source, as from an ophthalmoscope, is reflected to show a real, inverted image in front of the macula. This is illustrated by figure 1. With the ophthalmoscope light representing the object, the image lies just in front of the macula. By changing the lens in the ophthalmoscope head it is possible to view the reflected light either at the surface of the retina, at the point of formation of the image, or in front of this point. When the fundus at the macula is brought into accurate focus the foveal reflex is found to appear as a rounded, diffuse spot of light. If +2D. is then turned up in the ophthalmoscope head, a brilliant pin-point spot of light is seen. If an additional +2D. is used, the foveal reflex again becomes diffuse.

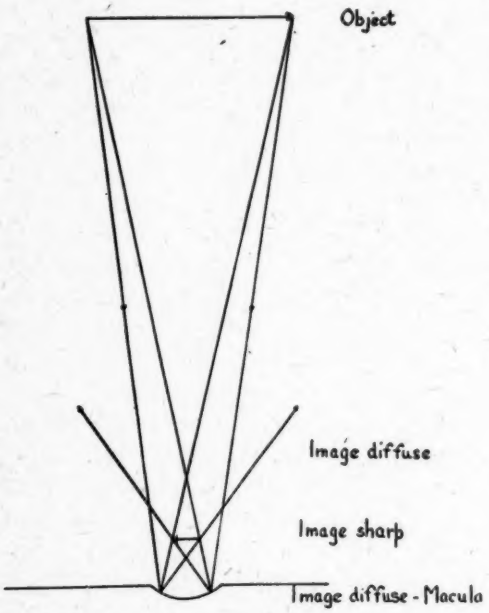

Fig. 1 (McCulloch). Size of diffusion circle in the macular area.

The foveal reflex is an inverted real image of the light source. If the object is moved in one direction, the image moves in the opposite. This is illustrated in figure 2; when the object is moved in the direction of the object arrow, the image moves in the direction of the image arrow. Therefore, if the ophthalmoscope is moved across the dilated pupil while the examiner is viewing the macula, the foveal reflex is seen to move in the opposite direction.

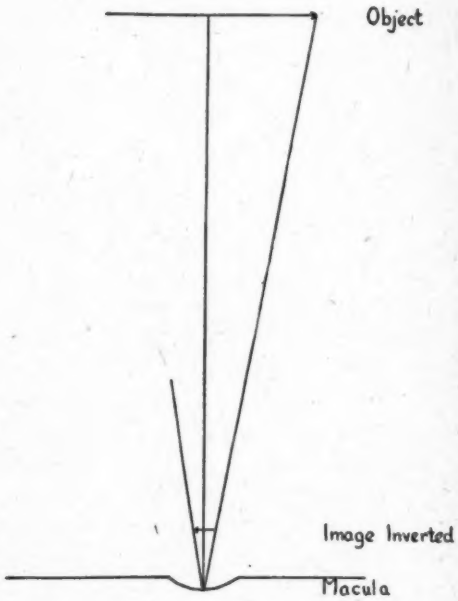

Fig. 2 (McCulloch). Formation of "against movement" at the macula.

Case reports

Case 1. A. H., a man aged 20 years, had viewed an eclipse as a boy; since then the vision of his right eye had been poor.

Vision. O.D. 20/60; O.S. 20/50. Right eye dominant.

Homatropine acceptance. O.D. −1.00D.

sph. ⊂⊃ +0.50D. cyl. ax. 90° = 20/30. P.H. unimproved. O.S. −0.50D. sph. ⊂⊃ +0.50D. cyl. ax. 75° = 20/20.

Fields. A small central scotoma, 2 cm. across, test object 4/2,000 blue, right eye.

Fundus. The macula of the right eye showed three yellow spots which did not move and had surrounding dark rings. The normal reflex was missing.

CASE 2. A. J. S., a man aged 29 years, had viewed an eclipse eight years ago. Since then the vision of his right eye has been poor, and small objects have seemed deformed.

Vision. O.D. 20/25; O.S. 20/20. Right eye dominant.

Postcycloplegic acceptance. O.D. +1.00 D. sph. = 20/25. P.H. unimproved. O.S. +1.50D. sph. ⊂⊃ +0.50D. cyl. ax. 90° = 20/20.

Fields. Central, thin crescent-shaped scotoma, 2 cm. long; test object 3/2,000 white, right eye.

Fundus. At the macula, right eye, was an immovable yellow spot, with a surrounding dark, "pebbled" area. The normal reflex was also present.

CASE 3. A. N. O., a man aged 21 years, had had poor vision since viewing an eclipse about eight years ago.

Vision. O.D. 20/30; O.S. 20/30. Right eye dominant.

Postcycloplegic acceptance. O.D. +0.50 D. sph. = 20/30. P.H. unimproved. O.S. +0.50D. sph. = 20/30. P.H. unimproved.

Fields. Both eyes showed small central scotoma for a 3/2,000 white test object.

Fundus. The macula of the right eye showed two, that of the left one, immovable yellow spots surrounded by dark rings. There were no normal reflexes.

CASE 4. J. C. P. M., a man aged 23 years, about nine years ago had viewed an eclipse. Since then the vision of the right eye had not been so good as that of the left.

Vision. O.D. 20/30; O.S. 20/20. Right eye dominant.

Postcycloplegic acceptance. O.D. +1.00 D. sph. ⊂⊃ +0.75D. cyl. ax. 105° = 20/20. O.S. +1.00D. sph. ⊂⊃ +0.25D. cyl. ax. 105° = 20/20.

Fields. Small central scotoma, test object 3/1,000 blue, right eye.

Fundus. The macula in the right eye was dark and the reflex did not move nor change with the lens in the ophthalmoloscope head.

CASE 5. J. E. P., a man aged 27 years, had viewed an eclipse seven years ago. Since then the vision of his right eye had been poor.

Vision. O.D. 20/50; O.S. 20/20. Right eye dominant.

Homatropine acceptance. O.D. +0.25 D. sph. ⊂⊃ +0.25D. cyl. ax. 105° = 20/40. P.H. Unimproved. O.S. +0.25D. sph. ⊂⊃ +0.50D. cyl. ax. 67° = 20/20.

Fields. Narrow crescentic central scotoma, 2 cm. long, test object 3/2,000 blue, right eye.

Fundus. In the right eye the lower part of the macula showed a yellow spot which did not move and was surrounded by a dark ring. Above this could be seen the normal foveal reflex, the lower part of which, near the yellow spot, was defective.

CASE 6. N. T. G., a man aged 21 years, since viewing an eclipse eight years ago, had had poor vision with his right eye.

Vision. O.D. 20/40; O.S. 20/20. Right eye dominant.

Postcycloplegic acceptance. O.D. −0.25 D. sph. ⊂⊃ +0.25D. cyl. ax. 90° = 20/30. P.H. unimproved. O.S. +0.25D. cyl. ax. 90° = 20/20.

Fields. Small central scotoma, 2 cm.

across, test object 3/2,000 white, right eye.

Fundus. The macula of the right eye showed a small central yellow spot which did not move and was surrounded by a dark ring having a pebbled appearance. There was no normal reflex.

CASE 7. J. C. G., a man aged 21 years, about seven years ago had viewed an eclipse. This dazzled him at the time, but he had not noted anything remarkable about the vision of either eye since then.

Vision. O.D. 20/30; O.S. 20/20. Left eye dominant.

Postcycloplegic acceptance. O.D. +0.75 D. sph. ⊂ +0.50D. cyl. ax. 75° = 20/30. P.H. unimproved. O.S. +0.50D. sph. ⊂ + 0.25D. cyl. ax. 80° = 20/20.

Fields. No field defect was found in the right eye, but the patient described seeing letters on the 20/20 line of the Snellen chart only when he looked at neighboring letters.

Fundus. The macula of the right eye showed a yellow immovable spot with a dark ring around it. There was no normal reflex.

SUBJECTIVE SIGNS AND SYMPTOMS

Six of the seven men in this series gave a history of reduced visual acuity in one or both eyes since viewing the sun or an eclipse of the sun.

The subjective signs vary. The patient may recall viewing an eclipse but not remember if his poor vision dated from that time. He may state that his vision has been poor since a certain year. Inquiry may then reveal that an eclipse of the sun occurred where he was living at that time.[3] However, some cannot remember how long the vision has been poor or do not even know that acuity is reduced in one eye.

The patient may complain of a central defect in his vision. This is due to a scotoma which is very small, exactly at the fixation point, and negative. He realizes that there is a hole in his vision because when he looks directly at a small object he cannot see it. If he looks to one side of the object, it comes into view. This symptom is present when both eyes are damaged or if the dominant eye only is affected. If the injury occurs in the nondominant eye, the scotoma may not be noticed, as in case 7.

The patient may recognize other changes in his vision. Objects in the central field may appear smaller or larger than normal, blurred, shifted, or twisted in position. This is particularly noticeable when the patient looks at the smaller letters of the Snellen chart.

Even without reduced acuity, the patient may discover a small central scotoma. He finds that the defect in his vision is just to one side of the fixation point, and although acuity is not affected he realizes something is wrong with the vision of that eye.

FINDINGS

1. Acuity. Six of the seven patients showed a not-correctable lowered visual acuity ranging from 20/25 to 20/40. In the other case vision was 20/20, although a small central scotoma was found.

2. Fields. Six patients showed a small central scotoma which was either relative or absolute, more frequently the former. It was always negative. It was very small, in four cases recorded as measuring 2 cm. across 2 meters. In two cases the scotoma was crescentic in shape, the length of the crescent being 2 cm. at 2 meters. One patient had no field defect but he noted a "hole" in his vision when looking at the 20/20 line of the Snellen chart. The ring scotoma as discussed by Loewenstein and Steel[4] has not been found in the present group of cases.

3. Fundus. In all cases the ophthalmoscopic appearance of the macula presented several characteristic features. These and variations for particular cases will be described in detail.

The foveal reflex was replaced by a bright red or yellowish spot at the center of the macula. This spot appeared sharp when accurate focus was made at the surface of the retina. As the focus was moved forward into the vitreous the spot became diffuse in appearance. It was steady and did not show the against movement which is normal for the macular reflex. When the spot was small, as in case 4, these two findings were all that differentiated it from the normal reflex. The size of the spot varied up to the diameter of one of the main retinal veins. Its shape was oval or round except in case 5, in which it had a crescentic appearance. Three yellow spots were seen in the macula of the right eye in case 1 and two in case 4. If the spot was large enough, its border could be seen to present a jagged outline.

In case 5 it was possible to see that the lesion lay just below the normal fovea. The lower part of the foveal reflex was irregular and defective, whereas the upper part was normal. In case 2 the normal foveal reflex and the abnormal yellow spot were both present. The abnormal spot was situated at the center and behind the normal reflex, was steady, and became continuously more hazy as focus was advanced into the vitreous. It did not show side-to-side movement but appeared separated from the normal reflex whenever the ophthalmoscope was moved.

In all cases the immediate neighborhood of the yellow spot presented a dark, irregular, "pebbled" appearance. This irregularity was either diffuse, quickly shading off into the surrounding fundus, or formed into short lines radiating from the central spot. If the lesion was large, this dark area was pronounced and suggested the aggregation of pigment about the defect. In the six cases in which one eye only was affected, the two maculas were compared and the difference between the normal and the abnormal was very striking. Under red-free light the difference was even more noticeable.[5] No cystic changes were found in the retina about the macula by Reese's retroillumination test.[6]

4. Color vision. Color vision, as tested by the Ishihara book and the American Optical Company plates, was normal in all seven cases.

5. Dominance. In six cases the lesion occurred in the right eye. In the other case it occurred in both eyes. Of the six cases, four showed right-eyed dominance, one left-eyed dominance, and in one the dominance was not recorded. The patient with the dominant left eye had not noted any peculiarity of vision despite the poor visual acuity of the right eye. The dominance was not recorded in the case showing lesions at both maculas.

Discussion

In diagnosing this condition there are a number of causes for a hole or cyst at the macula other than solar radiation which must be considered. If a defect such as has been described is found, the history may indicate the correct etiology. If the history is negative, other etiologies such as congenital or hereditary changes, senile degeneration, lesions caused by toxic agents, and contusion injury cannot be ruled out.

Differentiation from tobacco-alcohol amblyopia should always be made. This amblyopia shows no change at the macula, and a larger central scotoma, more marked, or only brought out by red. If the vision is below 20/40 it can be presumed that damage at the macula is extensive and the yellowish spot and dark

ring should be large. In tobacco-alcohol amblyopia vision is often 20/40 without any accompanying change in the appearance of the macula.

Colloid excrescences of the lamina vitrea near or at the fovea have exactly the same appearance as the yellow spot due to solar radiation. The excrescences occur usually in older people, however, and do not necessarily show the surrounding dark ring, the decreased acuity, and the central scotoma.

The central defect may be confused with an area of suppression when the prism method of plotting is used. However, a suppression area is larger, shallower, variable in size, shape, and position, and tends to disappear when the test object is moved. The scotoma due to solar radiation is small, frequently has a characteristic slit shape, a definite border, is constant in position, and is present even when the test object is in motion.

Cases of lowered acuity due to snow blindness have not been seen, so that the necessity of differentiation from this entity has not arisen.

Other causes for decreased acuity, such as keratoconus, corneal nebulae, lens opacities, and congenitally defective eyeball accompanying inferior crescent can be ruled out in the course of the general eye examination.

Other authors report a greater lowering of acuity than has been noted in this series. Pittar,[7] Würdemann,[8] Harman and MacDonald,[9] and Lodge[10] had cases which were tested shortly after the injury. If these cases had been seen years later they might have shown better visual acuity. Birch-Hirschfeld's[11] cases showed a marked improvement with time. Damage to the macula from contusion is likely to be more extensive than that due to solar radiation, which would account for the greater lowering of acuity in contusion cases.[12] In the one case of this series which did not show lowering of acuity, the damage must have been just off the most sensitive area of the macula.

The great preponderance of lesions in the dominant eye is probably related to the fact that most people, when viewing a bright object like the sun, narrow both palpebral fissures and close completely the nondominant eye first. Loewenstein and Steel[4] pointed out that an individual is likely to allow an eye with fundus disease to be overexposed to the sun. However, the great majority of cases occur in normal eyes.

Pittar's[7] report is of particular interest. Enemy planes attacking our positions prefer to fly "out of the sun." Our men when aiming their guns must look directly toward the sun and are therefore liable to macular and perimacular damage. Such cases will probably be seen in all stages, from the reception of the injury to the final result. The cases described here represent only the residual damage.

As all the present cases were drawn from young men in the R.C.A.F., the age and sex distribution can be of no significance.

Verhoeff, Bell, and Walker[13] have stated that the changes at the macula due to solar radiation are due to damage from heat. The lens of the eye focuses the rays from the sun on the retina. At the pigment epithelium these rays, of many wave lengths, are absorbed, producing heat which damages the neighboring structures. The rays from the sun's corona are about as strong as those from the moon.[14] Damage must therefore be due to the subject's examining the sun's disc, either partially or not at all occluded, and not to rays from the corona. The crescent-shaped scotomas obtained in this series measured about 2 cm. in length at 2 meters. This represents about 30 minutes, which is the same angle as that subtended by the sun. Similarly sized scotomas were

found by Klang.[15] These scotomas may represent images of partial eclipses burnt in the pigment epithelium. Dimmer[16] suggested, however, that the crescent-shaped figures he saw at the macula might represent the path of damage as fixation moved during the viewing of the eclipse. This explanation could hardly account for the small scotomas found in the present series, for to fulfill Dimmer's hypothesis they would have needed to be at least larger than the angle subtended by the sun's diameter.

The pathologic changes at the macula caused by solar radiation have not been adequately described. Coats and others[17] have outlined in detail the changes that occur in connection with a hole at the macula due to other causes. He describes cystic spaces in the retina which, when sufficiently large, form a hole. A small amount of fluid may be present under the macula and adjacent retina, and the pigment epithelium may show atrophic changes. The appearance of the lesion following trauma and that following solar radiation are somewhat similar.

Greeves[18] has suggested that holes at the macula from various etiologies might be assumed to be comparable. However, there are several particulars about changes at the macula due to solar radiation that indicate changes due to this cause may have their own peculiarities. The central yellow spot in the cases herewith described is very small. In no instance is it as large as some of the holes at the macula described in the literature.[19] The surrounding "pebbled" and "darkened" area is characteristic. It is as constantly present as the central yellow spot, whereas a "pebbled" ring is not always seen surrounding a hole due to other causes. Würdemann[8] has described the possible changes following macular damage from the flash of an electric arc. He described a central hole, surrounded by a darkened area. His case was seen shortly after exposure, and he ascribed the dark area to a local hemorrhage under the macula. The dark ring which is seen in the present cases may be due to such a hemorrhage which has become partially absorbed. Pigment aggregation in the underlying choroid, local proliferation of pigment epithelium, or dispersion of pigment into the retina might all produce such an appearance. The clearness of the dark ring suggests that it at least does not lie outside the pigment epithelium. Finally, if cystic changes occur at the macula neighboring a hole, an optical situation could possibly be set up which would produce this darkened appearance. However, in this series no such changes were found.

Though several pathologic changes may be possible, one in particular seems likely. Verhoeff, Bell, and Walker[13] point out that the retina absorbs very little light but the rays pass through to be absorbed at the pigment epithelium. Most of the heat produced would be at that position. We would therefore expect the pathologic changes to center at the pigment epithelium.[20] The dark ring seen about the yellowish spot is probably due to an aggregation of pigment about a burnt-out hole in the pigment epithelium. Such a change, located at the pigment epithelium, would be different from that of a hole of the macula due to a blow or toxic agent which primarily affects the retina and not the pigment epithelium.

Summary

Seven cases of residual change at the macula probably due to solar radiation have been reported.

1. A method for plotting very small central scotomas with the tangent screen, and a method for noting the properties of the normal macular reflex, were described.

2. A small central scotoma was found

in six of the seven cases.

3. The fundi in all seven cases showed an abnormal yellow spot at the macula, surrounded by a dark ring.

4. In six of the seven cases the lesion was in the right eye. Four of these cases were right-eye dominant, one left-eye dominant, and in one the dominance was not recorded.

In the discussion it was pointed out (1) that other causes for cyst at the macula must be considered, and the condition differentiated from tobacco-alcohol amblyopia, colloid excrescences, and suppression areas when doing scotometry; and (2) that the pathologic change at the macula probably centered at the level of the pigment epithelium and not at the level of the retina.

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CAUSES OF FAILURE IN THE TREATMENT OF SQUINT*

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The problem of treating squint has many phases, the success of each markedly influencing the management of the others. Treatment consists of accurate diagnosis, refraction and glasses, treatment of amblyopia, preoperative orthoptics, surgery, and postoperative orthoptics. Obviously, if poor diagnostic methods are used, or inaccurate deductions made from the diagnostic findings, all the rest of the treatment will be more difficult or impossible. The same will be true about improper glasses, inadequate treatment of amblyopia, lack of orthoptic aid, or improper surgery. Success can come only from intelligent integration of all these steps. Another factor adding to the difficulty of treating squint is the relative lack of accurate statistics in many of the series reported, and the widely variable final results which would seem satisfactory to different observers. There are those who are satisfied when the patient or parents are pleased. Others are satisfied with a residual squint of a given measurable amount, whereas the "purists" would be satisfied with nothing less than two straight eyes, seeing well together.

STANDARDS OF "CURES"

Squint "cures" must be defined and qualified better than has been done to date. In 1939, the British orthoptists[1] suggested a standard of cure, but did not allow for partial cures or grades of cures. I should like to suggest four classes or grades of "cure." The *first* would correspond very closely to the standards set up by the British—that is, straight eyes, normal vergences, good fusion and stereopsis carried into reading and other daily visual tasks. The *second* would leave the patient with a small heterophoria, having good fusion and stereopsis on the synoptophore, but varying from fusion to diplopia on the red glass and Worth 4-dot test, and with an inconstant ability to bar read. The *third* would leave the patient with a small heterotropia and fair vision, only fair fusion on instruments, and little fusion carried into daily tasks. The *fourth* would leave a heterotropia of small degree, but with no fusion or visual requirements—a cosmetic "cure" alone.

With standards similar to these, cures could be properly graded and qualified in the future. It is manifestly impossible to achieve a grade-1 cure in all cases, but that need not discourage the ophthalmologist and orthoptist from trying to get a less perfect grade of correction.

CAUSES OF FAILURE

In a brief review of certain recent writings, the following comments were found bearing on the causes for failure in the treatment of squint. Feldman[2] listed the obstacles to squint training as: 1. suppression, 2. amblyopia, 3. abnormal retinal correspondence, and 4. vertical imbalance. Hitz[3] listed the problems in treatment of squint as: 1. fixed abnormal retinal correspondence, 2. marked anisometropia, 3. aniseikonia, and 4. variable vertical imbalance not limited to a single muscle. Allen[4] listed: 1. abnormal retinal correspondence, 2. amblyopia, and 3. combining surgery of vertically and laterally acting muscles in a single operation. Dunnington and Wheeler[5] suggested: 1. improper preoperative analysis, 2. variability

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in size, strength, and insertion of muscles, and 3. the difficulty in determining the exact amount of lengthening or shortening done, as factors in the lack of success in surgery of squint. They found that alternating convergent squint, and squint in patients between three and eight years of age, gave the largest percentages of poor results. Grant,[6] in discussing their analysis, stated that alternating esotropia, and esotropia of the convergence excess type, were especially difficult to handle. Davis[7] thought that surgical failure was due to: 1. improper preoperative diagnosis, and 2. improperly performed, or poorly conceived surgery. Fralick,[8] and White and Brown[9] emphasized the difficulties encountered in treating the combined vertical and lateral squints. Ellett, Rychener, and Robinson[10] found failures greater when amblyopia or abnormal retinal correspondence persisted. Berens, Elliott, and Sobacke[11] in 1941, and Bressler[12] in 1936, in analyzing series combining surgery and orthoptics, found over- and undercorrection much greater when no orthoptic training had been given. Mrs. Adler[13] listed: 1. prolonged esotropia with vertical imbalance, 2. macular suppression, and 3. persisting poor fusion in cured amblyopia, as conditions causing difficulty in treating squint. Miss Lancaster[14] suggested: 1. suppression, 2. abnormal retinal correspondence, 3. failure to get amplitude, 4. failure to convert laboratory fusion skills to daily needs, and 5. failure to arouse active rather than passive response from patient as chief stumbling blocks to orthoptic success.

It would seem, then, that lack of success in the treatment of strabismus may be due to diagnostic ineptitude or error, or to failure to apply recognized principles and technique to treatment of the visual, orthoptic, and surgical problems at hand. A further analysis of these deficiencies should be helpful.

Visual and Refractive

When the visual and refractive sources of failure are considered only a word or two are necessary to discuss ocular disease, refractive error, and anisometropia.

Often opacity of the lens, or evidence of past inflammation of the central retina or optic nerve, each of which should be apparent when the eye is examined with a mydriatic, would seem to preclude binocular vision. The examiner must not lose sight of the fact, however, that the visual loss may be due in small part only to the obvious disease, whereas the overlying amblyopia ex anopsia resulting from the disease causes the greater loss. I recall many such cases in which I expected little visual improvement, but was pleasantly surprised with the result of adequate occlusion.

I call your attention again to two comments of Hitz.[3] He among others states that marked anisometropia is probably a bar to single binocular vision. This is undoubtedly true in spite of an occasional case to the contrary. Hitz, in discussing also the role of accommodation in squint, urged that refraction be *repeated* at least once before surgery, to assure complete relaxation of accommodation, and thus avoid surgery on an eye with purely accommodative squint. Davis,[7] in his numerous writings, has repeatedly emphasized the error of performing any surgery on an eye with such a squint. These cases should be treated by glasses and orthoptics alone. I have had two patients for a number of years, whose eyes when not accommodating are divergent, and when accommodating are convergent. These were cases of pure accommodation, wherein the medial recti were ill advisedly recessed.

The chief visual cause of failure in the treatment of squint has been the failure

to recognize amblyopia ex anopsia as such, and the failure to treat it adequately when recognized. Fortunately, there are only a few ophthalmologists who find a very high percentage of so-called "congenital" amblyopia among their patients. I need hardly say that congenital amblyopia is best diagnosed by exclusion, after adequate treatment for amblyopia has been given.

Amblyopia ex anopsia is mentioned as a prominent cause for failure in squint treatment by Allen,[4] Ellett, Rychener, and Robinson,[10] Dunnington and Wheeler,[5] Yoxall,[15] Stringer,[16] Dicke,[17] Feldman,[18] and Hitz,[3] to mention just a few writers. Dunnington and Wheeler found it in 50 percent of their series of 211 cases, and Feldman in 42 per cent of his private cases and in 55 percent of his clinic cases. Other writers have found amblyopia ex anopsia present in about 50 percent of their cases.

When considering the treatment of such amblyopia, it is apparent that in spite of the overwhelming evidence and opinions in favor of constant and complete occlusion,[4,5,7,8,13,15] failure is frequently due to "too little and too late" occlusion. I have been inclined to believe that total occlusion only is worthwhile but that satisfactory, stable return of vision is not probable after the age of eight years (of course, depending somewhat on the age of onset and on the vision at the beginning of treatment). I feel that if there is no central fixation after two to four weeks, or no definite improvement in vision after three months of complete occlusion, further treatment of vision is not justified. Hitz believes that central vision should return in one to two weeks. Feldman suggests that six months of occlusion offer a fair trial for visual improvement. On the other hand, Yoxall,[15] using total occlusion up to 19 months, obtained central fixation in 41 of 42 cases, and equal vision in the two eyes of many up to the age of 12 years, by occluding for additional months. Stringer,[16] by constant occlusion for a period up to 12 months in 150 patients, obtained central fixation in 92, and equal vision in 66. It is evident, then, that whereas some (especially the British orthoptists) would occlude longer than others, constant occlusion for an average of three to six months should be attempted before failure is conceded. Allen stressed the importance also of macular and bimacular stimulation as well as occlusion, as being essential to good treatment of amblyopia ex anopsia. When a final vision has been attained, Ellett and his associates[10] felt that an acuity of less than 6/12 precluded 3d-degree fusion, and this would lead to failure in the functional cure of the squint.

In the light of these findings it would seem that inadequate and belated occlusion, allowing amblyopia to persist, and possibly high degrees of anisometropia, are the chief visual causes of failure in the treatment of squint.

Binocular vision (Orthoptics)

The visual relationship of the eyes is most important to the success or failure of squint treatment. The simple improving of vision by refraction and occlusion and the straightening of eyes by surgery may do little or nothing toward aiding the two eyes to see together correctly. Functional cure must be actively sought after cosmetic "cure" has been attained. This is the field of "orthoptics" primarily. Linksz[19] states that "the objective of orthoptic treatment is reëducation of faulty binocular skills," while Miss Lancaster[20] says that orthoptic training is a matter of teaching binocular skills, but cannot change structure.

In the field of orthoptics more than in any other special phase of ophthalmology,

simple though sensible explanation of the problem to the parents, gaining the interest and maintaining the attention of the young patient, and instilling enthusiasm for the successive steps in treatment by the orthoptist are prime essentials for success. "Rapport" between patient and operator is more important than technical procedure. Conversely, failure in any of these endeavors will lead to failure in orthoptic treatment.

The more specific causes of failure in the field of orthoptics are: 1. failure to recognize and adequately to treat suppression, 2. failure to recognize and treat abnormal retinal correspondence, and 3. failure to correlate surgery and orthoptics properly.

Particularly confusing to many who have superficially viewed binocular relationship is suppression. They fail to recognize that good vision may exist, or be established in each eye, and very deep-seated suppression still be present. The large numbers of alternating suppressors are a major problem in the treatment of squint. The persistence of suppression in the monocular squinter after amblyopia has been overcome is a common cause for failure in further progress. Mrs. Adler, Miss Lancaster, and Feldman mention suppression as a major difficulty in the treatment of squint; Miss Lancaster believes that overcoming suppression is the most difficult step in all orthoptic procedure. Feldman found suppression present in 80 percent of his private and 60 percent of his clinic cases, and was able to overcome it in about 50 percent of patients in each series.

Abnormal retinal correspondence is present in approximately 50 percent of all squinters (Ellett, 36 percent; Davis, 36 percent; Pugh,[21] 50 percent; Travers,[22] 56 to 60 percent; Smith[23] 50 percent; Feldman, 14 percent private and 30 percent clinic; and Hitz, 57 percent). It is evident, then, that in the treatment of about 50 percent of all squinters, so-called binocular training without recognition of abnormal retinal correspondence can but lead to a deepening of the abnormal correspondence and make the eventual cure more difficult, if not impossible. The prognosis for the non-surgical cure of abnormal retinal correspondence ranges from the rather complete lack of success reported by Fowler[24] on minimal orthoptic treatment, to the almost 100 percent cures reported by Miss Lancaster[14] as the result of prolonged and intensive orthoptic training. Successes variously reported have been by Miss Smith[23] almost all cases, Feldman[2] 50 percent, and Hitz[3] 58 percent.

Both suppression and abnormal retinal correspondence occur more often, and are more "fixed" the earlier the age of onset of the squint, the longer the duration of the squint, and the more constant the angle of deviation. It is apparent, then that the earlier treatment is begun, the surer will success be. Failure in early constant occlusion until retinal correspondence is normal and well established and the eyes are straight will almost invariably cause failure in obtaining functional cure.

The finishing steps in orthoptic treatment are just as important, equally difficult, and much less often attained. They are the obtaining of adequate amplitude of fusion and the ability to transfer binocular skills from instruments to daily visual tasks. The rewards for carrying functional cure to completion are: 1. stabilization and "anchoring" of the eyes in the straight position gained, 2. adequate true depth perception, and 3. retention of vision in the cured or improved previously amblyopic eye. Persistence in treatment as exemplified by some of our British and American orthoptists has merit.

Relationship of orthoptics and surgery

The correlation of surgery and orthoptics in the treatment of squint presents an interesting problem, and some excellent work has been done. What effect does pre- and postoperative orthoptics have on the deviation, and on the final functional result? What effect does abnormal retinal correspondence have on surgery? What effect does surgery have on abnormal retinal correspondence? The answers give us clues to the successes and failures in surgical treatment of squint.

Miss Pugh[21] states that surgery in the presence of abnormal retinal correspondence may result in: 1. the establishment of normal retinal correspondence immediately postoperatively, 2. the persistence of the abnormal correspondence at the new angle, and a change in the angle of anomaly, and 3. finally and most disastrously, the persistence of abnormal retinal correspondence, and a return to the original deviation. Miss Smith[23] cites 25 patients with abnormal correspondence operated upon, of whom 14 (56 percent) obtained normal correspondence, while in 11 (44 percent) abnormal correspondence persisted, with return to the original deviation. Grant,[6] in discussing Dunnington and Wheeler's report, states that young squinters with abnormal retinal correspondence will frequently become normal after surgery. I have found this often to be true. I would suggest that about 50 percent of the patients with abnormal retinal correspondence operated upon will develop normal retinal correspondence, and have not hesitated to operate if intensive training and occlusion have not changed the retinal correspondence in several weeks.

The effect of abnormal retinal correspondence and orthoptic training on surgical procedures has been well studied by Bressler,[12] Berens, Elliott, and Sobacke,[11] and Hitz.[8] Bressler found that of 150 patients operated on who had had no orthoptic treatments, 32 percent had straight eyes and 8 percent had some fusion; of 32 who had only postoperative orthoptic training, the eyes of 47 percent were straight and 75 percent had some fusion; while of 36 who had pre- and postoperative orthoptics, the eyes of 56 percent were straight, and 81 percent had some fusion. A similar result was obtained by Berens and his associates. Of 324 patients operated upon 144 had surgery alone, of whom 22 per cent obtained straight eyes (phoria or better) and 46 percent had some fusion; of 83 operated on and given postoperative orthoptics only, 50 percent had straight eyes and 80 percent had some fusion; whereas of 97 patients having pre- and postoperative training, 63 percent had straight eyes and 82 percent had some fusion. The percentage of overcorrection was appreciably smaller in those patients having pre- and postoperative orthoptics. It was an interesting fact that while there was a higher percent of satisfactory alignment in those who had had pre- and postoperative orthoptics, the fusion status and the number of cases of normal retinal correspondence were not appreciably better in those having pre- and postoperative training than in those having postoperative orthoptics alone.

Hitz found that 47 percent of patients having surgery but no orthoptics had some fusion, whereas 74 percent of those having surgery and pre- and postoperative orthoptics had some fusion. Also, he found that on operating upon patients with abnormal retinal correspondence he obtained a 69-percent cure of deviation, whereas in cases with normal retinal correspondence 85-percent cure of deviation was obtained (table 1).

It may be assumed from these studies that orthoptic training definitely improves

the percentage of satisfactory postoperative alignment and fusion status, and that the percentage of overcorrections is less. However, the case for pre- and postoperative orthoptics, as opposed to postoperative orthoptics alone, may not be so decisive. None the less, it may be concluded that the failure to associate orthoptics with surgery increases the percentage of failures in final functional cure.

TABLE 1

RELATIONSHIP OF ORTHOPTICS AND SURGERY

Authors	Total Patients Operated On	Surgery Only		Postop. Orthoptics		Pre- and Postop. Orthoptics	
		Straight percent	Fusion percent	Straight percent	Fusion percent	Straight percent	Fusion percent
Bressler	150	32	8	47	75	56	81
Berens, et al.	324	22	46	50	80	63	82
Hitz			47				74

In considering the role of orthoptics in the success or failure of treatment for squint, I would suggest that delayed treatment, inconstant treatment, or the failure to obtain active interest and coöperation from the patient, will lead to failure. I would stress the absolute necessity of continuing monocular occlusion throughout the treatment for amblyopia, through the preoperative training, through the surgery, through the postoperative course, until alignment and fusion are assured. The interruption of occlusion is a mistake.

SURGERY

The surgical causes of failure in the treatment of squint would seem to be chiefly: 1. lack of careful preoperative analysis, 2. the occurrence of a vertical imbalance associated with the lateral, and 3. failure to preserve adequate function of the individual muscles, and the convergence function.

It is not possible to emphasize too strongly the necessity for careful analysis of the individual squinter before any surgery can be considered. Davis,[7] Dunnington,[25] and others have discussed this at some length. In considering the results of such a careful analysis, it is well to reëmphasize that eyes with a purely accommodative squint, or the accommodative element in any squint, should not be touched by surgery. On the other hand, eyes with a purely mechanical squint, or the mechanical element in any squint, must of necessity be operated on. Measuring carefully the *total* squint (that is, with the patient accommodating, wearing no correction, and not under cycloplegia) and deducting from it the *mechanical* element (that is, with the patient under full cycloplegia and with full correction), will yield the *accommodative* element. This element is not cured but is made worse by surgery.

It is possible that the 3-to-8-year-old group of Dunnington and Wheeler, in which they obtained an undue percentage of overcorrection, may have contained many accommodatives. It is known that the accommodatives usually do not assert themselves well until the age of 3 or 4 years, and that they become stabilized somewhat at the age of 6 to 10 years. Thus the 3-to-8-year group would have the greatest number of unstable accommodatives, and when operated on would yield a large percentage of overcorrections.

As to the combination of vertical and lateral imbalance, the literature is replete with evidence that such a combination is most difficult to cure. It is a rather common occurrence, moreover, if a given series is analyzed carefully. White and Brown[9] found an incidence of 34 percent combined vertical and lateral imbalance in a group of 1,062 squinters, whereas Feldman[2] found 80 percent verticals among his private cases and 55 percent in his clinic. It is significant that he could cure only 10 percent of his private and none of the clinic patients. Fralick,[8] and White and Brown[9] stated that more surgery seemed necessary in such cases, and the number of satisfactory results was less than when a lateral squint alone was present. Both, however, felt that the substitution of recession of the inferior oblique for the more common myectomy offered greater possibilities of success.

In considering the surgery in such combined cases, White and Brown suggested that the operation be performed on the vertical muscle first, unless the lateral squint was large. They felt that the lateral rectus may be operated upon with greater safety than the medial rectus, and that in many cases the lateral and an inferior oblique may be safely operated upon together. Allen, however, is reluctant to operate upon vertically and laterally acting muscles at the same time. I am inclined to operate upon the lateral first whenever it is large, and have not hesitated to recess an inferior oblique at the same time. One point of caution should be made: When an esotropia and moderate overaction of the inferior oblique is being considered, it must be remembered that correcting the esotropia throws the ocular alignment away from the chief field of action of the inferior obliques, and minimizes their effect. Thus, in many instances the inferior obliques need not be touched after the esotropia has been corrected.

The final point in considering surgical failure is that of preserving individual muscle function and the convergence function. This cannot be stressed enough. Dunnington and Wheeler,[5] and Duthrie[26] have emphasized this point. I have noted in examining postoperative cases in the orthoptic clinic at Episcopal Hospital, that many patients who have a satisfactory cosmetic result in the primary position will have an obvious weakness of abduction or adduction in the eye that has been operated on, or an equally obvious weakness of convergence. Even the more moderate postoperative weaknesses will probably preclude a functional cure. I do not wish to minimize the importance of a great cosmetic improvement, but to obtain binocular single vision is even more desirable.

Some points in technique causing these failures are: 1. the difficulty in gauging the surgery necessary in the individual case, 2. the difficulty in determining the exact amount of recession or resection accomplished, 3. too much recessing or shortening of a single muscle, 4. too many muscles operated on at one time, and 5. disproportionate recessions and resections of opposing muscles.

I am sure that every surgeon has had difficulty in applying the general rules to his individual case, in trying to decide what and how much surgery to do, and then, when operating, has not been able to estimate just how much he has set his muscle forward or back. The amount of stump, the amount of muscle in the muscle clamp, the exact placing of the sutures in the muscle, and whether they will stay there or not, are all factors with which he must reckon.

Dunnington and Wheeler, as also Bressler, felt that combined recession and resection give the most satisfactory results. Recession alone was rather dis-

appointing in amount, Dunnington getting an average correction of only 7.3 prism diopters for a 5-mm. recession, while a 5-mm. recession and a 10-mm. resection allowed an average correction of 40 prism diopters.

It need not be stated that the unguarded tenotomy of a medial rectus is likely to result in failure, since such unguarded procedures must lead to extremely variable results. The same thing may now be said about the myectomy of the inferior oblique. The recession of this muscle is definitely preferable.

To emphasize again the surgical causes of failure, we must list insufficient or inaccurate preoperative analysis, the frequent occurrence of combined vertical and lateral imbalance, and, finally, the failure to preserve the individual muscle and convergence functions.

Summary

An attempt has been made after a somewhat brief reference to the literature, to list and discuss the pitfalls in the treatment of squint. The commonest and most important of these would seem to be: 1. persisting amblyopia—due to belated, inconstant or insufficient occlusion; 2. failure to recognize or sufficiently treat suppression and/or abnormal retinal correspondence; 3. the difficulty of managing a combined vertical and lateral imbalance; 4. the failure to distinguish between the accommodative and the mechanical elements in a given squint; and 5. the failure to stabilize and obtain functional cure by adequate postoperative orthoptic training.

Comment

A somewhat brighter note might be injected after all of the difficulties have been mentioned. The chances for grade-1 cure would seem to be good in the following types of cases: 1. pure accommodative convergent squint—which should be treated by orthoptics (with the aid of glasses); 2. pure divergence excess—to be treated by surgery and orthoptics; and 3. pure divergence insufficiency—to be treated by surgery and orthoptics also.

The over-all picture may be somewhat discouraging if the number of grade-1 cures could be exactly tabulated. However, a lesser grade of cure is better than a cross-eyed child.

I often wonder whether the prolonged orthoptic procedure to which some children are subjected is fully justified. Do that child's future ocular and binocular needs justify all of this time, expense, and wear and tear on the nervous system of the patient? I doubt it. We might, then, pick the cases for prolonged orthoptics in which there is the greatest chance of true cure, and make the other patients happy by simply making them look better.

1150 Connecticut Avenue (6).

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Discussion

Marjorie V. Enos (New York). Since we all have a certain proportion of failures, this is a subject of intense interest.

I think Dr. Costenbader's four grades of "cures" are very good, and I would suggest that we use them in the future in classifying records in doing research.

Perhaps one of the most discouraging failures is that of a postoperative exotropia following a preoperative esotropia. Dr. Berens has been kind enough to allow me to analyze nine cases from his records, seven of exotropia and two of exophoria following operations for esotropia. These patients were operated upon prior to 1938 and have been examined at this office within the past year. I might add that all of these patients were not operated upon by Dr. Berens.

In analyzing these patients I found that four had amblyopia with vision of less than 20/200 in one eye. Three of these improved to 20/50 or better. The fourth was an adult who found it impossible to undergo occlusion. The remaining five had approximately equal vision in the two eyes.

Six of the nine had anomalous correspondence, the other three normal correspondence.

Seven of these patients presented some hypertropia.

The refraction showed: four with hyperopia (one +3.75D. O.U., the other three of less than +1.00D. in each instance), two with myopia, three with practically no refractive error.

The surgery performed involved procedures on 28 different muscles: 12 recessions of medial recti, 1 central tenotomy of a medial rectus, 4 resections of lateral recti, 1 O'Connor cinch on a lateral rectus, 6 tenotomies of inferior obliques, 1 myotomy of an inferior oblique, 1 myectomy of an inferior oblique, 2 resections of inferior recti.

The number of preoperative-exercise visits ranged from 1 to 3, 5, 30, and 35, but the number the patients may have had with other oculists could not be ascertained. All of the patients had exercises postoperatively except one adult who found them impossible. The two exophoria patients improved with exercises Three of the exotropia patients have had further surgery with little improvement in one and 3d-class cures in two (Dr. Costenbader's classification).

We realize that these are too few cases from which to draw conclusions, but the high incidence of anomalous correspondence and hypertropia show them to be contributing factors in failures. Certainly these were not accommodative squinters on whom operations were mistakenly

done. The boy who showed the hyperopia of +3.75D. at the age of 7 years did not show it at the age of 13.

Dr. Costenbader has asked me to mention the relationship between the technician, the patient, and parents and to show what factors in this relationship may make a cure difficult. Of course, the noncoöperation of either patient or parent is the greatest stumbling block. There must be a will to achieve. I have found my best approach with the 5-year-old is to get on a friendly basis with the child, making the parents quite secondary, and put the coöperation up to the child himself. "Jack, you know *we* want to help your eyes, do *you* want to help? Will you try to do what your eyes need? Wear the patch? Work hard at your exercises?" and I find it brings much better results than trying to make the exercises a pseudo play period. Not that we don't have fun but if the child knows he is at the office on serious business we get much further. The younger children have to be handled differently, and I find that the hardest period which most of them go through is when play must give place to work.

How to explain the squint and its difficulties to the parents is a problem on which technicians have been working; I have found that time and patience, using terms which the parent can understand, provide the best solution. Some parents are helped by printed material to read, but most of them want to have the situation explained in relation to the individual child. In most cases we find that each patient is an individual problem, with no two just alike. I believe that this is something we need to keep in mind, for it is very easy to catalog patients as certain types of cases and forget the human element involved.

35 East Seventieth Street (21).

NOTES, CASES, INSTRUMENTS

GONIOTOMY

PRELIMINARY DEEPENING OF THE ANTERIOR CHAMBER WITH AIR OR SALINE SOLUTION

OTTO BARKAN, M.D.
San Francisco, California

There are two chief difficulties associated with the performance of goniotomy: the root of the iris may be caught with the tip of the knife and the peripheral part of the iris may fall before the knife toward the end of the incision, owing to escape of aqueous. I have found that these difficulties can be prevented by injecting the anterior chamber with saline solution or air prior to goniotomy.

Injection of saline solution preliminary to goniotomy. Physiologic saline solution (intravenous) is introduced for the purpose of widening the angle. It produces a troughlike circular depression of the peripheral portion of the iris, abolishing the posterior chamber and causing the iris to hug the surface of the lens. The normal bulge of the iris is replaced by a concavity. In addition, the excess pressure of the aqueous in the anterior chamber and the absence of aqueous in the posterior chamber prevent the iris from falling before the knife, even if some aqueous escapes through the puncture during the incision.

In adults, preliminary deepening of the chamber* is particularly helpful in eyes of normal or shallow-chamber depth (emmetropia or hyperopia) and in those in which the chamber is made shallow by the large size of the lens. The procedure is also helpful in myopic eyes, though not so necessary since the chamber is already deep and the entrance to the angle is wide.

In infants with congenital glaucoma preliminary deepening of the chamber is rarely indicated because of the increased depth of the anterior chamber in this condition. However, in cases in which cloudiness of the cornea precludes operation under the contact glass and renders visibility difficult even in goniotomy without the glass, preliminary deepening of the chamber is helpful.

Deepening of the chamber by means of injecting saline solution may also be indicated postoperatively in the occasional case in which there is undue bleeding, in order to raise the pressure and stop hemorrhage. It also prevents contact of raw surfaces and formation of adhesions between the iris and the incision in the angle wall.

Injection of air preliminary to goniotomy. In 1938, in the course of cyclodialysis, I observed that injection of the anterior chamber with air not only deepened the chamber but also made the angle visible without the contact glass. It was evident that injection of air into the anterior chamber provided conditions which would make goniotomy without the glass feasible. This was confirmed in the rabbit and the dog. I have injected sterile air into the anterior chamber in several cases for this purpose. However, disturbing factors may present themselves, such as reflections from the anterior and posterior corneal surfaces, or production of folds in Descemet's membrane by the fixation forceps if the pressure has been lowered. Moreover, the size of the image is smaller than when seen through the magnifying system of cornea and aqueous or cornea and saline solution. The magnifying power of these fluids for oblique observation

* Deepening of the anterior chamber with saline solution as a preliminary to cataract extraction in the presence of a shallow chamber and to iridectomy in glaucoma was originally suggested by *Howard*.[1] It was incorporated by me[2] in a procedure for iridectomy in glaucoma of the narrow-angle (shallow-chamber) type.

as in goniotomy is approximately 1.15 ×. When combined with the power of the contact glass the total magnification when seen through the contact glass, cornea, fluid system amounts to about 1.73 ×, whereas there is no magnification when seen through air.

Further experience and observation of results will do much to determine the relative merits of the various modifications of goniotomy.

490 Post Street.

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AN ATYPICAL CASE OF MARFAN'S SYNDROME

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Camp Lee, Virginia

In a recent publication by Rados,* the subject of ectopia lentis associated with arachnodactyly was so completely covered that there is very little to add concerning this rare and interesting condition. The author stressed genetics in his explanation of the syndrome and believes that any theory which considers a disturbance in the germplasm should receive special credence. It is pointed out that hereditary factors which may be located in the same chromosome may be subject to "coupling." Such genetic "coupling" could explain the frequent association of abnormalities arising from different germ layers that occur in one person. Any theory which attempted to explain Marfan's syndrome as a congenital mesodermal dystrophy presented difficulty in explaining the position of the ectopic lenses in this syndrome because of the ectodermal origin of this ocular part of the syndrome.

The case herein described offers several features which are atypical and which perhaps may add further to the theory of genetic coupling and possibly even of "crossing over within the chromosome."

The patient, a colored man aged 22 years, was examined in June, 1942. He had come because of his poor distance vision, which with the right eye was 2/200 correctable to 5/200 and in the left eye was 20/40 correctable to 20/30. His glasses were last changed about two years earlier. The patient believed his glasses were not so good as they had been when he first secured them. However, he did not suspect that any condition was present which could not be helped by glasses. He knew that his vision in the left eye had not been so good as that in the right eye for about five years, but he had not realized that the difference was as great as actually existed. There was no history of trauma to the eyes nor was there any indication of previous ocular disease. The past history failed to uncover any significant childhood illnesses. The patient had never been hospitalized and had never suffered from any serious injuries. He thought that his physical make-up closely resembled that of his father. His mother was rather small and showed no remarkable physical likeness to himself. There were three brothers none of whom particularly resembled the patient. The family history disclosed no abnormality of

* Rados. Marfan's syndrome. Arch. of Ophth., 1942, v. 27, March, p. 477.

the eyes and no significant systemic diseases. The patient did not recall the stature of either his maternal or paternal grandparents. He knew of no immediate nor remote relatives who had ocular or developmental skeletal anomalies. He had been well all his life and had worked chiefly as a stevedore. He suffered at no time from shortness of breath or other symptoms referable to the cardiorespiratory system.

The patient weighed 198 lbs. and measured 73.5 inches in height (fig. 1). His

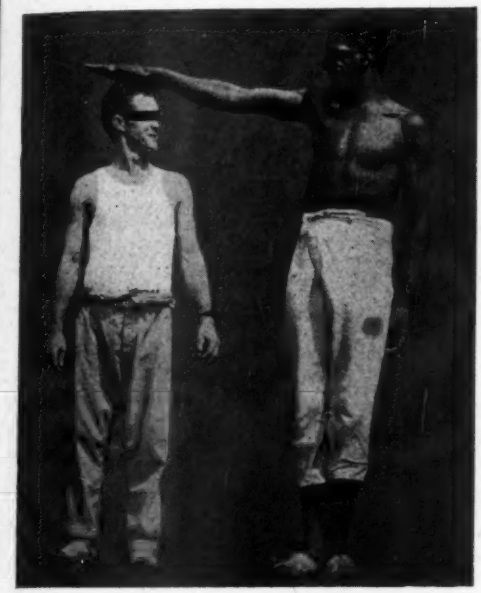

Fig. 1 (Rosen). This gives an idea of the patient's great "span" which was greater than his height.

muscular system appeared well developed but there was no excessive formation of subcutaneous tissue. The patient's skull was dolicocephalic, with extremely prominent supraorbital ridges. The frontal "bosses" were very pronounced, causing the supraorbital ridges to end in the mid line in the form of a "V." The eyebrows were heavy and extended well onto the glabella, meeting in the mid line. The hairline formed a downward point in the region of the bregma. The nose showed a deeply sunken broad base and resembled a "boxer's" nose because of the prominent oblique ridges where osseous and cartilaginous tissues unite. The nasolabial folds were very deep. The chin was somewhat prominent and square. There was no

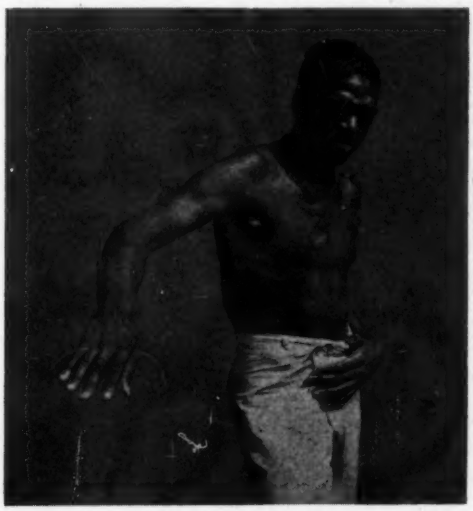

Fig. 2 (Rosen). Shows the patient's facial appearance. There is a worried, sad appearance, although the patient is in his early twenties. The prominent frontal bones, the elongated head, and the wrinkled brow all stand out prominently.

abnormality of ears, lips, or teeth. The palate was high and quite narrow. The characteristically sad and aged expression of the patient was apparent (fig. 2).

There was no abnormality of the neck. The limbs were very long but fairly well developed. They could not be considered "gracile." The patient's span was 76 inches (2½ inches greater than his height). His arms were so long that the open hand almost reached his knees. His hands were 10 inches in length but were not characteristically arachnodactylic, being proportionately enlarged rather than specifically gracile. X-ray studies disclosed no relative enlargement of one of the carpals or phalanges over any other bones. There was a slight indication of webbing

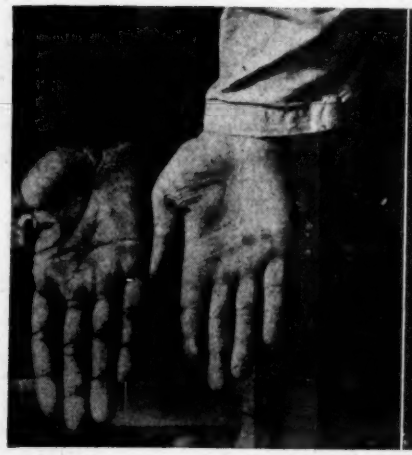

Fig. 3

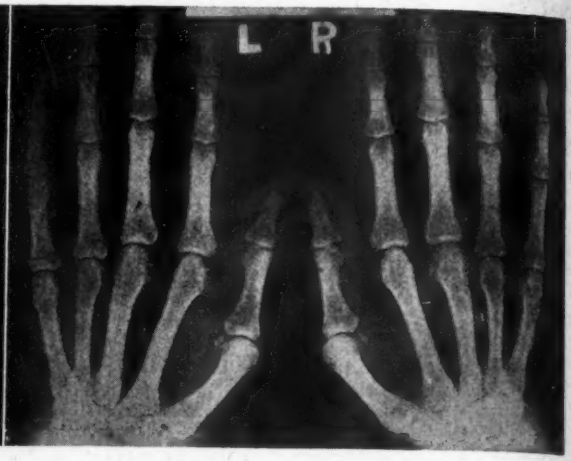

Fig. 4

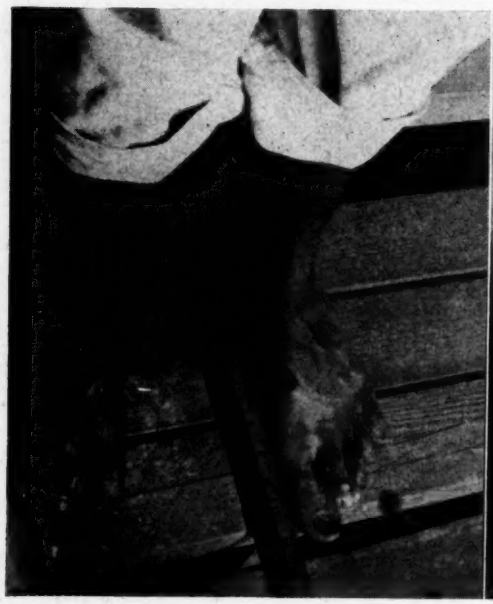

Fig. 5

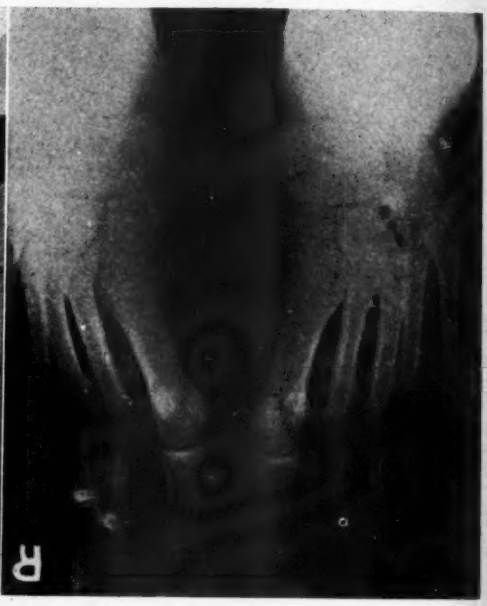

Fig. 6

Figs. 3, 4, 5, 6 (Rosen). The characteristic appearance of hands and feet together with their respective X-ray views.

of the hands. The patient wore size-12 shoes, which were quite narrow. The great toe was 5¼ inches long. The foot tapered rapidly. X-ray studies revealed an intorsion of the terminal lateral three phalanges of each foot (figs. 3, 4, 5, 6).

The chest wall was elongated but somewhat narrow and flat, with a tendency toward pigeon-breast formation. There was no special curvature nor abnormality of the scapulas. The thighs appeared disproportionately long and both patellas seemed to extend well above the knees. No anomalies of the feet, such as club feet

or hammer toe, were noted.

Cardiologic consultation was reported as being negative. X-ray film of the heart was normal, and electrocardiographic tracings were reported as being within normal limits. No abnormality of the aorta or other vessels was encountered.

The patient's eyes were rather light brown in color. No gross disturbance of muscle balance was obtained except upon testing the near point of convergence, when it was noted that the left eye turned in until 145 mm. and then diverged. The corneas were clear and quite large, being 12.5 mm. in diameter. The anterior chambers were deep. The pupils responded to both light and accommodation. There was a pronounced tremulousness of each iris.

The right lens was displaced upward and outward; the left was displaced upward and inward but to a much less degree. The exposed lower border of each lens was thrown into a series of sinuous folds and the zonular fibers in each eye were readily visible (fig. 7). The pupils dilated readily with homatropine and paredrine, contrary to the usual difficulty encountered in most cases of this condition. Slitlamp studies showed the lens of the right eye to be displaced so superiorly that vision could not be improved through refraction, whereas in the left eye the lower edge of the lens was somewhat removed from the pupillary axis, and correction to 20/25 vision was obtainable. The arrangement of the zonular fibers could easily be studied and these were seen to pass both anterior and posterior to the edge of the lens. In some positions the fibers were deficient, and in these regions a corresponding flatness of the lens edge could be seen (fig. 7).

There was no granule deposit upon the zonular fibers. The vitreous was not unusual nor did the fundi show any remarkable variations from the normal. The correction accepted for the left eye was −1.25D. sph., giving vision of 20/25.

From a review of the case reports, the occurrence of Marfan's syndrome in a colored person is not too common even if it is incomplete. The ocular signs in this case were atypical in that the pupils dilated readily with mydriatics, and there was no high degree of myopia (O.S. −1.25D. sph.). On the other hand, characteristic iridodonesis, ectopia lentis, and megalocornea existed (12.5 mm. diameter in each eye). It would seem that amongst the ocular signs themselves there was some indication of an "aberrant ocular anlage."

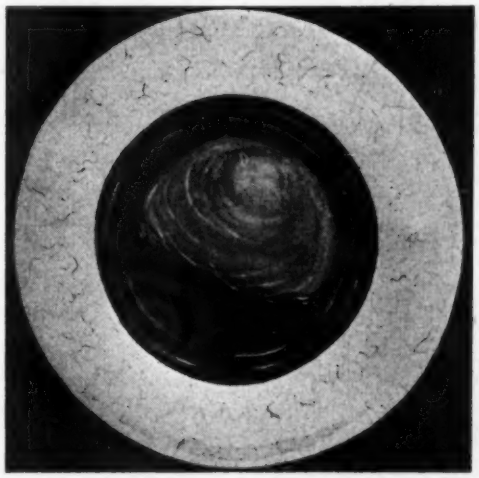

Fig. 7 (Rosen). The dislocated cataractous lens is seen to be displaced upward. The zonular fibers are readily visible.

There was no real disturbance in subcutaneous fat or musculature, as is described in the typical syndrome. Although there was an apparent over-all skeletal enlargement there was no suggestion of "gracility." The patient's hands and feet were large but they were not particularly thin. The patient's span, skull, and chest fitted in more closely with the habitus of "status dysraphicus." There were no anomalies of the cardiac system.

This case presents some features con-

stant in Marfan's syndrome with others suggestive of the "status dysraphicus."

EENT Clinic, ASF Regional Hospital

A NEW VISUAL-TEST CABINET

LESLIE C. DREWS, M.D.
Saint Louis

This apparatus allows us with the pull of a single counterweighted cord stretched across the room to spin the test characters, and to present six different-sized test characters one at a time.

This apparatus was shown before the Southern Medical Association, Section of Ophthalmology in 1941. Publication and description are prompted now by a recent paper of Dr. Walter H. Fink, "An evaluation of the visual-acuity symbols," at the American Ophthalmological Society in May, 1944.* Fink advocates the use of a modified Landolt ring with multiple breaks in the circle. The "illiterate E," of course, could also be used with this cabinet.

The inexpensive test cabinet is designed to permit its use in the many places where visual acuity is being tested. Obviously it is often impractical to suggest the use of a projector. One could use a single 20/20 Landolt Broken Ring and determine at what distance the patient can see it. But it is so simple to build and maintain the apparatus as shown, and it is so much more usable to have at least six different-sized rings, that a cabinet with only one ring is not practical. Besides, the most objectionable feature of such an apparatus is the cord stretched across the room, and one cord is the minimum that could possibly be expected. Even a cabinet with only one broken ring would require one cord to spin the ring. This cabinet needs but one cord.

* Amer. Jour. Ophth., 1945, v. 28, July, p. 701.

For ophthalmologists who do not use a projector, a combination of such an apparatus with a regular test chart is of considerable value. The standard test chart does not give enough choice of large letters. There are only a few large letters, and these are quickly learned. This cabinet could be equipped with 20/400, 20/300, 20/200, 20/150, 20/100, and 20/75 Landolt Rings. The ophthalmologist then would have an infinite number of test characters of these sizes. It is much harder to memorize the smaller letters on the Snellen charts since there are many more of them, and the use of two or three Snellen charts showing letters of only 20/60 and less is simple and not too bulky. The selection actually demonstrated was 20/200, 20/150, 20/100, 20/70, 20/40, and 20/20 characters, but any combination desired could be used. The aperture in the front of the cabinet was made large enough to expose the 20/400 ring.

Description of apparatus. The test characters are mounted on small wheels which are spun on axles (fig. 1). The axles pass through a strip of plywood and are fastened to small wooden pulleys of varied sizes on the opposite side of the plywood strip (fig. 2). By raising or lowering the single counterweighted cord (#1) stretched across the room the operator gives impetus to the strip of plywood, moving it up or down. The plywood strip is counterweighted with string #2 and weight *W*. In moving up or down, a fixed pulley (*a*) is caused to spin by the counterweighted string #3. The tension of this #3 string must be maintained so that the string wrapped around pulley *a* will move all the rest of the pulleys. In order to maintain this proper tension without tightening the string occasionally, the string is carried over a fixed pulley and counterweighted with weight *W2*. The counterweight must be heavy enough to

Fig. 1 (Drews). Face of the visual-test cabinet.

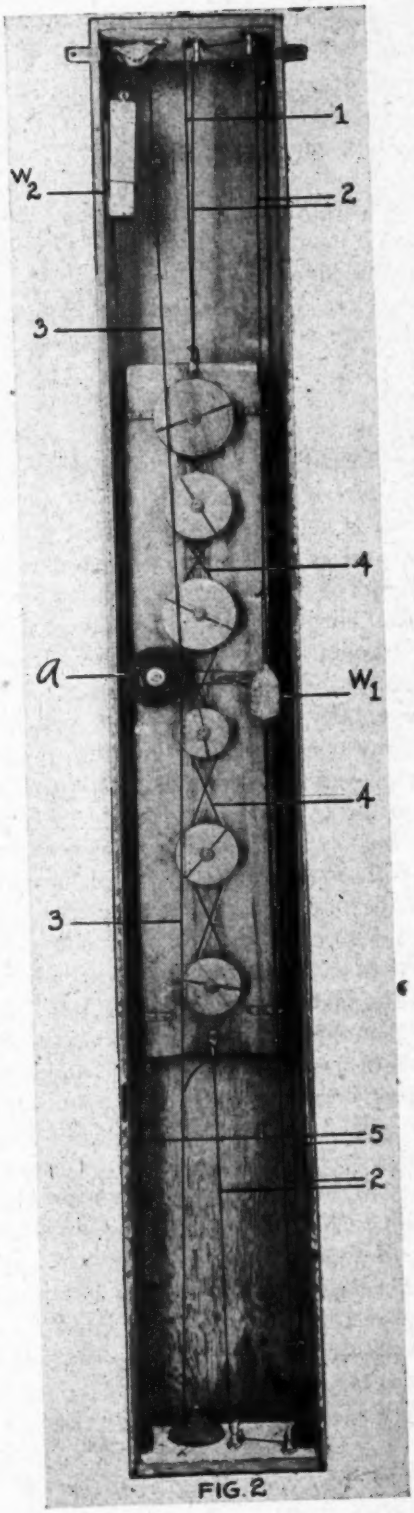

Fig. 2 (Drews). Rear view of visual-test cabinet.

produce the necessary tension. A ball-bearing pulley is used here so that the counterweight may always produce the correct tension.

A second pulley, just behind pulley *a* in the photograph, is placed in contact on its flat surface with pulley *a* through a ball-bearing friction device so that the second fixed pulley spins only when the plywood is moving downward. This ball-bearing friction feature could be omitted and the two pulleys fastened rigidly together. A continuous string (#4) is wound around this second pulley and around all six of the pulleys on which the six test characters are mounted. The plywood strip is held in perfect vertical plane by two wires (#5) stretched from top to bottom of the cabinet and passing through metal rings attached to the plywood strip as shown. Since the test characters are rotated by pulleys of varied sizes they all rotate different amounts with each downward movement of the plywood strip. And since the pulley imparting motion to the pulleys bearing the test cards moves only on downward movement of the plywood strip, on upward movement all the test characters remain stationary. Besides, alternate test characters spin clockwise and counterclockwise. The lines on the pulleys (fig. 2) were placed there so that the observer could see that these pulleys spin at different speeds and in different directions. The clock numbers on the front of the cabinet are added for convenience, but may be omitted if desired. No special lighting has been provided. With such a small area to be illuminated this can easily be done.

The apparatus has one disagreeable feature: *even the examiner himself cannot tell what the correct answer is without seeing the characters.*

516 Metropolitan Building.

THE IMPORTANCE OF INJECTING AIR INTO TENON'S CAPSULE EVEN IN CASES OF FOREIGN BODIES WITHIN THE EYEBALL

A. L. Peter, Major (MC), and Emanuel Rosen, Captain (MC), A.U.S.
Camp Lee, Virginia

It is possible, as this case report well illustrates, to localize a foreign body within the interior of an apparently normal-sized eyeball, with extremely accurate measurement, and yet be in entire error as to its actual locale. It therefore at once becomes evident in cases of related pathologic change that some other clinical procedure is necessary to confirm the diagnosis than just those tests that we are at present employing. The following case is presented to point out this startling shortcoming in our present-day methods.

The patient, W. M., aged 25 years, was referred to the hospital for the purpose of having an enucleation of his right eye performed because of the possibility of sympathetic ophthalmia. His ocular story dated back some three years, at which time, while in the dangerous performance of striking the head of an axe with a hammer, an intraocular foreign body was acquired. Upon subsequent inspection of the hammer the patient was able to detect a notch in the tool he was using, and sensing the entrance of a foreign body into the right eye, he sought immediate medical aid. Appropriate procedures were undertaken, including slitlamp studies, X-ray localizations, and tests for magnetism; magnetic extraction was attempted. Two trials were made to extract the foreign body, both unsuccessful. Following the second attempt the patient noticed that the right eye was somewhat higher than the left. In the next two years the patient suffered from recurrent

attacks of redness in the right eye, which usually cleared in three or four days. Vision had been reduced to light perception within six months after the injury through development of a complicated cataract. About six weeks before the patient's initial examination at our hospital, a minor direct injury occurred to the right eyeball, necessitating hospitalization at a station hospital. There an intraocular foreign body was visualized. The case was considered one for surgical removal as a prophylactic procedure in view of the recurrent attacks of redness and the visualization and localization of an intraocular foreign body.

Upon the initial examination the right eye was found to have light perception only. The lid of the right eye appeared slightly lower than the left and the right eye was seen to be a good deal higher than the left. Motility seemed to be good in the cardinal directions of gaze.

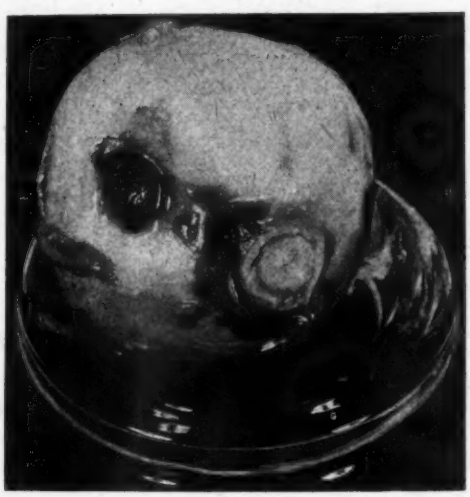

Fig. 1 (Peter and Rosen). The posterior aspect of the eyeball with the black seedlike mass lying in front of the brownish sacklike herniation that is just lateral to the foreign body. Both structures appear to lie within a funnel-like pit. Just lateral to the foreign body is a rather unusual view of the optic nerve, central artery, and vein and the vaginal sheath of the optic nerve. Some of the stumps of the extraocular muscles can be seen.

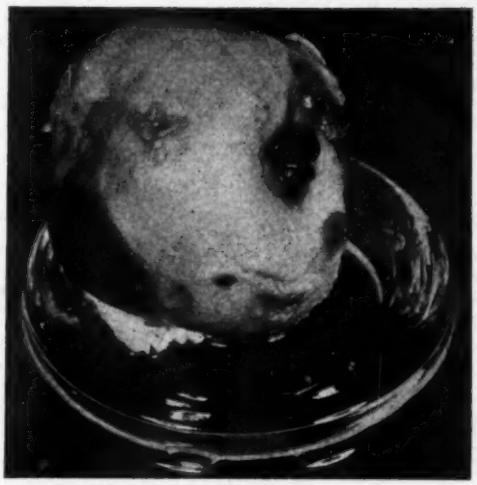

Fig. 2 (Peter and Rosen). A lateral view which shows a side view of the cornea and sclera indented at the point of entry of the foreign body. The foreign body is seen lying above the herniated uveal tissue and looking like a piece of coal.

There was a somewhat dense scar in the conjunctiva, running from the limbus at the 10-o'clock position to the cul-de-sac in a similar meridian. A second defect was visible in the conjunctiva at 3 o'clock about 1 mm. external to the limbus, where the sclera was puckered, indented, and discolored. The pupil was drawn toward the limbus at the 3-o'clock position in the manner of a narrow iridectomy, and both pillars of the colobomatous iris were incarcerated in a corneal limbal scar in that area. The pupil reacted promptly to light both directly and consensually. The iris was of greenish color; that of the fellow eye was grayish. There was no disturbance in the anterior chamber—no cellular deposits and no "K.P's." There was a dense calcified whitish cataract which was completely opaque. Transillumination appeared to be negative. The left eye showed no abnormalities, certainly none related to inflammatory changes such as might be suspected in sympathetic ophthalmia.

The eye was enucleated under intra-

venous sodium-pentothal anesthesia. Some difficulty was encountered in attempting to undermine the conjunctiva at the 10-o'clock position, where the conjunctiva was bound down to the sclera. At 3 o'clock another adhesion was present, rather close to the limbus, which, however, presented no great difficulty and was dissected out. An anomalous insertion of the external rectus was encountered, probably secondary to multiple adhesions resulting from hemorrhage. After the severance of all the external muscles the nerve was cut, whereupon the peculiar shape of the globe became apparent. In the posterior aspect of the globe, just nasal to and above the

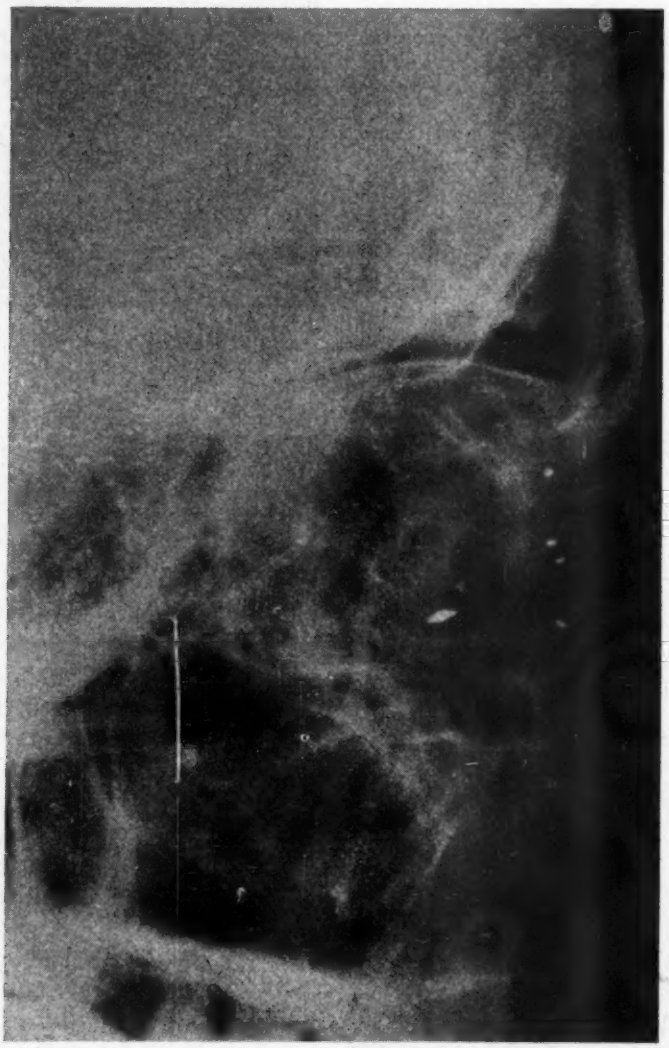

Fig. 3 (Peter and Rosen). A lateral view of the X-ray plate, showing the markings of the Comberg contact lens. The foreign body is shaped like an arrowhead and upon measurements lies 16 mm. behind the limbus.

severed optic nerve, was a brownish-black structure, almost the size and shape of a small watermelon seed, which seemed to lodge in a declivity of the posterior wall of the eye. The picture was a striking one (fig. 1) and resembled the dimple and stem of an apple. Many loose adhesions were present around this seedlike mass, which, after separation, allowed the herniated sac (probably uveal and retinal tissue) to be visualized clearly. With a slight amount of pressure, a metallic foreign body was expressed from this seed, much like a pit from a grape. The herniated tissue could then be traced down to a small cleft in the sclera which seemed to be closed off more or less completely (fig. 2).

X-ray films taken by several men placed the foreign body in the eyeball itself. X-ray studies were made at the time of injury and a few months later. The patient was shown the foreign body upon the film and was told it was intraocular. He learned to recognize the shape of this foreign body and readily pointed it out in a subsequent examination upon the X-ray film. The eye was again X rayed at a station hospital where again the foreign body was believed to be within the eye. Indeed, because of the location of the foreign body and recurrent redness of the eye the patient was transferred for enucleation. The eye was again X rayed at this hospital, a picture being taken with the eye looking in the medial and the extreme lateral positions. Because of the shift of the foreign body in each view it was assumed that the foreign body was in the eye, moving with that structure. Not being completely satisfied with this study, we applied a Comberg contact lens to the eyeball for further localization. After corrections were made in accordance with the magnification factor it appeared that the foreign body was located 16 mm. posterior to the horizontal limbal markers, which placed the foreign body definitely within the eyeball. No great difficulty appeared in establishing this foreign body within the eyeball especially when the eyeball was considered to be emmetropic or close to emmetropia. The patient believed his right eye was normal, no glasses having been used prior to the accident (figs. 3 and 4).

A recently rewritten article by Pfeiffer[1] on X-ray localization appears to establish

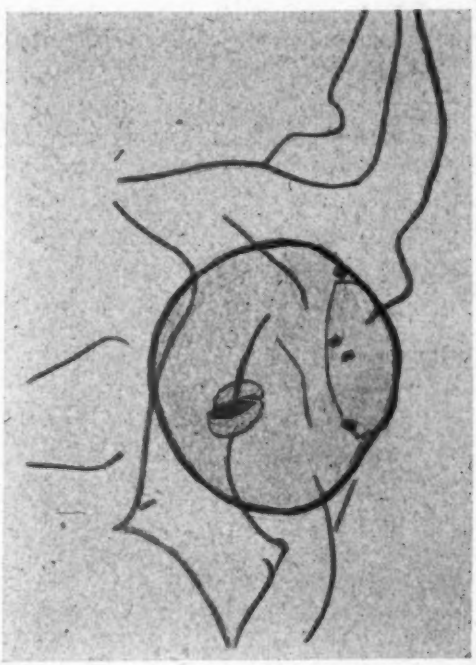

Fig. 4 (Peter and Rosen). A schematic sketch which attempts to illustrate the approximate position of the eyeball upon the X-ray plate.

the Comberg technique of localization as the method of choice after he had tried experiments with five other procedures. Most industrial ophthalmologists consider this procedure superior. For its outstanding advantage Pfeiffer claims accuracy. He also reiterates that successful extraction depends upon accurate localization and states that precise localization is imperative. The importance of air injection

into Tenon's capsule when a foreign body is in or at the posterior sclera or when there is a double perforation has been pointed out.[2] However, this case report would seem to emphasize the importance of air injection in almost all cases of deeply located foreign bodies, for a lateral view in this case would have shown an indentation mapped out by the air injected into Tenon's capsule. Such a procedure would possibly have disclosed the "double penetration" and shown the fallacy of the application of the magnet. Since the metallic body was enclosed in a sac with some retractile character it is possible that contraction bands were a factor in the production of the indentation of the posterior sclera. However, one feels that the application of a magnet in an endeavor to retrace a "double perforation" very likely brought about this marked dimpling. The importance of air injection thus must be emphasized especially in view of its comparative simplicity.

ASF Regional Hospital.

References

Pfeiffer, R. Arch. of Ophth., 1944, v. 32, Oct., p. 261.
[2] Spackman. Amer. Journ. Ophth., 1932, v. 15, p. 1007.

SOCIETY PROCEEDINGS

EDITED BY DONALD J. LYLE

NEW YORK SOCIETY FOR CLINICAL OPHTHALMOLOGY

October 2, 1944

DR. MILTON L. BERLINER, *presiding*

SYMPOSIUM ON ALLERGY IN OPHTHALMOLOGY

CHEMISTRY OF ALLERGY

MARGARET B. STRAUSS, M.Sc., stated that formerly antigenicity was associated exclusively with proteins, but it has lately been shown that polysaccharides and lipoids may also invoke antibody production. Many drugs, such as the antisyphilitic arsenicals and sulfonamides, give rise to illnesses similar to the serum-sickness reactions seen to follow antibacterial serum therapy. Sensitivity to pure vitamin B_1 has been reported and there are many comparatively simple substances, known as haptens, which combine with proteins to form true antigens with the capacity to sensitize.

Recent work indicates that an antibody is a specifically modified molecule of globulin. Therefore, any cell which forms globulin may theoretically be capable of becoming sensitized. This sensitized cell may react anamnestically at some later date as a result of either a specific or a nonspecific antigenic stimulus.

Desensitization does not occur in man for that type of allergy known as hay fever. The skin-sensitizing antibody is not appreciably reduced in concentration after treatment with the antigen, but a new type of antibody is produced which has a greater affinity for the antigen and so the latter is not available to react with the skin-sensitizing antibody in the blood or tissues, and this explains the alleviation of clinical symptoms of hay fever.

PHYSIO-PATHOLOGY OF ALLERGY

DR. SAMUEL J. PRIGAL said there is no specific pathologic picture of an allergic reaction; many are reversible. Anaphylaxis shows but little other than marked disturbance in physiology—smooth-muscle spasm which causes different types of death in different experimental animals. Local anaphylaxis shows a distinct pathologic picture of inflammation and fibrinoid degeneration, subject to modifications by such factors as degree of sensitization, the amount of allergen used, time of application, and certain physical factors. It is an accelerated inflammatory response.

The pathologic picture commonly seen in asthma, hay fever, urticaria, contact dermatitis, and nasal polyp were briefly described. Allergization is enhanced or initiated by infection or its products, as Burky has shown. If his conclusions are correct, then it is possible that in intrinsic asthma one may be concerned with an allergy to the mucous membrane or degenerated products of the respiratory tract. A number of diseases of unknown origin may be of allergic nature. The pathologic picture of periarteritis nodosa, acute disseminated lupus, rheumatic fever, scleroderma, and dermatomyositis is suggestive of an allergic inflammatory reaction. Experimentally some of these diseases have been reproduced through allergization. Klinge injected horse serum into the joints of animals previously sensitized to it and demonstrated not only joint pathology but inflammatory responses in the myocardium. Bruun con-

firmed this and showed that application of cold could vary the pathologic picture. Rich was able to reproduce periarteritis nodosa experimentally by the use of horse serum.

It cannot be definitely stated whether an allergic response is a purposeful or an aberrent phenomenon. There are reasons to believe that allergy is one of the many defense mechanisms of the body. Allergy and immunity are closely related. Both are primarily concerned with an antigen-antibody reaction. In immunity no untoward reactions occur. Cohen believes this to be due to the fact that no H (histamine-like) substance is produced. In allergy, the liberation of the H substance in the tissues results in smooth-muscle spasm or allergic inflammation of the tissues. Opie states "in allergy vital organs are protected at the expense of the local injury."

OPHTHALMOLOGIC EXPRESSIONS OF ALLERGY

Dr. Ferdinand L. P. Koch said allergy and immunity in clinical ophthalmology are of importance, since certain ocular disorders are due to hypersensitivity and allergy, and because ocular diseases of other etiology may be influenced by allergy and immunity. Thus, there are to be considered the allergic reactions of the tissues of the external eye, allergy and immunity in intraocular infections, and the relation of these latter allergy-influenced diseases to organ-specific eye proteins. Allergens (antigens) may be bacterial in origin or may be substances incapable of producing any reaction except in the 1 or 2 percent of persons with a tendency to allergy who become hypersensitive after exposure to allergens.

Sensitization in ophthalmology may occur either locally (primary) or as a part of a systemic (secondary) process, and any tissue or combination of tissues of the eye may exhibit these allergic processes. Allergies of the skin of the lids are usually more marked but essentially similar to those of the skin in general. Blepharitis may ensue because of contiguous skin or conjunctival allergy or it may occur alone. The offending allergens frequently require exhaustive clinical detective efforts to track them down. Basically these are chemical, for the most part, whether they are drugs, industrial agents or poisons, cosmetics, foods, plant pollens, and so forth.

Conjunctival allergy frequently coexists with skin allergy. Acute allergic conjunctivitis frequently is very sudden in onset, with such marked chemosis that there is protrusion of the swollen, relatively pale conjunctiva, the bulbar more marked than the palpebral. The symptoms and findings are less severe in the subacute type, which frequently is an expression or an exacerbation of the chronic type. The chronic variety is often seasonal and difficult to treat because it usually is caused by more than one allergen. The consensus, in general, regarding vernal catarrh is that it is seasonal in onset and allergic in symptomatology and appearance.

Phlyctenular keratoconjunctivitis is encountered less frequently than formerly but is generally regarded as an allergic manifestation to tuberculoprotein. Possibly food allergies and bacterial toxins act in some instances with the tuberculoprotein symbiotically. In luetic interstitial keratitis at birth the spirochetes in the cornea apparently sensitize it so that it is reactivated later by toxins formed when other syphilitic foci become active. Corneal ulcers, especially dendritic and superficial punctate, may circumstantially be of allergic origin.

Allergic episcleritis and scleritis, while frequently associated with other ocular

allergies, are most probably initiated by circulating allergens, the overlying conjunctiva being a protective cover. They present a difficult problem regarding identification of the responsible allergens and respond reluctantly to therapy. Sclerosing keratitis may occur and usually defies therapy, but tuberculin desensitization has aided in some instances when indicated.

Allergic manifestations in the uveal tract are more common than has been appreciated and range from the minimal seen in very mild iritis during low-grade upper-respiratory infections to the most severe sympathetic ophthalmia. Choroiditis of otherwise undetermined origin occasionally may be termed allergic by exclusion and a search should be instituted for the responsible allergen.

Woods and others have accepted Elschnig's theory that sympathetic ophthalmia is due to the antigenic activity of the uveal pigment of the injured eye, resulting in hypersensitivity especially in the uveal-tract cells of the fellow eye. Subsequent absorption of the pigment of the injured eye produces allergic reaction in the pigment tissues of the second eye. Sympathetic ophthalmia very occasionally has ensued subsequent to the occurrence of endophthalmitis phaco-anaphylactica. Rupture of the lens capsule, whether traumatic, spontaneous, or surgical, may result in diffuse intraocular inflammatory reaction because of allergy to lens matter, and these patients will give a positive skin reaction to lens protein, just as those with early or established sympathetic ophthalmia react to uveal-pigment skin testing.

Most patients with atopic dermatitis eventually develop lens opacities. As the lens is of ectodermal origin, many workers in allergy believe that severe allergic systemic reactions not infrequently are accompanied by the development of lens opacities which are arrested as the reaction subsides.

There is much difference of opinion regarding allergies of the retina. Edema of the macula, retinal hemorrhages, and retinal detachments are reported as allergic manifestations, but it is difficult to understand the mechanism underlying retinal hemorrhages as a direct expression of allergy.

The treatment of allergy is notoriously unsatisfactory in many instances and there is no uniformly effective procedure. Adequate investigation is not always feasible and local treatment is the main reliance. Slightly acid buffer solutions afford comfort by lowering the increased pH of the tears and secretions. Local vasoconstrictors and cold afford relief, but astringents and antiseptics should be avoided. Specific desensitization should be performed where indicated in tuberculosis, brucellosis, and syphilis. Garretson's dictum should be borne in mind: ". . . obliteration of all toxic and psychic stresses, activation of endocrine function, chiefly thyroid and suprarenals, will cure symptoms of allergy. With normal adrenal content in the blood stream, allergic symptoms cannot occur."

The role of staphylococcal and brucella infections in development of autosensitization

Dr. Earl L. Burky said that it has been shown that staphylococcal toxin can produce in rabbits sensitivity to rabbit lens and muscle. These results suggested that infection, under certain conditions, can produce autosensitization. This could not be verified experimentally until it was found that Brucella produced a low-grade ocular inflammation and lens sensitivity. These observations suggest that similar autosensitization states can develop in humans and that staphylococcal infections are responsible, particu-

larly in blepharoconjunctivitis with or without eczema elsewhere, for the production of autosensitization to some constituent of the skin.

Leon H. Ehrlich,
Secretary.

LOS ANGELES SOCIETY OF OPHTHALMOLOGY AND OTOLARYNGOLOGY

SECTION OF OPHTHALMOLOGY

October 23, 1944

PLASTIC CLOSURE OF DEFECT FOLLOWING ORBITAL EXENTERATION

DR. DEANE C. HARTMAN presented a case involving plastic closure of a defect following orbital exenteration which was complicated by an opening into the nasal cavity. .He presented the patient and showed photographs which illustrated the original condition and deformity.

Mrs. L. B., aged 64 years, came to the clinic at White Memorial Hospital with a history of a recurrent tumor of the lower lid and inner canthus of the right eye, following several previous applications of radium during the preceding six years. Vision in the right eye was 20/25. Biopsy revealed that the lesion was a basal-cell carcinoma. The advice of the Tumor Board of the Hospital that complete exenteration be done was carried out to include all the contents of the orbit with the exception of the lacrimal gland and the outer one third of each eyelid. At the time of the operation it was necessary to remove the anterior ethmoidal labyrinth and lacrimal fossa, the frontal process of the maxilla, and the lacrimal bone as well as the anterior portion of the ethmoid labyrinth including the adjacent mucosal lining. A radium pack was inserted over the area.

When Dr. Hartman saw the patient for the first time there was a pyramidal-shaped deformity, lined only with bone and having an opening 2½ cm. in diameter, which extended into the nasal cavity. The patient was very much annoyed and distressed by the frequent and painful dressings which were necessary.

Dr. Hartman discussed the several methods possible which might have been used to correct the situation. The most acceptable method, cosmetically, of advancing adjacent tissue was rejected because it offered no adequate lining and would cause distortion of facial expression together with uncertain healing due to tension. The second method, that of a free skin graft to the area, was also rejected because of insufficient thickness and lack of blood supply at the base of the defect. Poor resistance would almost certainly lead to infection and granulation.

Dr. Hartman chose to use a forehead pedical flap with the base and blood supply from the temporal area in front of the ear. The undersurface of the apex of the flap was lined with a free split-skin graft taken from the thigh one week prior to the transfer of the flap. Upon transfer the lined tip was placed over the opening into the nasal cavity and the base was allowed to rest in a gutter cut between the remaining portions of the eyelid at the outer canthus, so that no raw surface was exposed. The denuded area of the forehead was covered by a full-thickness skin graft taken from the abdomen. A pressure dressing was arranged so that each area received the optimal amount of pressure during healing. Cosmetically the appearance could have been improved by replacing a pedicle flap in its former position; however, the patient refused the last step because she was entirely pleased with the present condition. She wore a dark glass over the right orbital area and the appearance was acceptable.

Dr. Hartman closed his remarks with the reservation that although the plastic procedure is adequate, it is important to determine whether the tumor recurs or not.

Heredo-macular degeneration

Dr. Robert J. Schillinger presented M. D., a man, aged 23 years, who complained of loss of vision at the age of 15 years. He had had several examinations and refractions without benefit, and no one had been able to explain his poor vision. During pre-induction examinations by the local draft board, he was accused of malingering.

Examination revealed no external pathologic change, no disturbance in the anterior segments or media, and no gross fundus findings at first glance. Careful examination of the macular areas, however, showed a ring of very dim yellowish-white foci resembling drusen around each macula. The macula, however, in each eye was normal. The optic discs and vessels were normal. There was no increase in intraocular pressure.

The vision was R.E. 20/100, L.E. 20/200. Visual fields were normal for form, but for color were greatly constricted, especially to green, and more markedly with the left eye.

In his discussion Dr. Schillinger brought out the known facts of this type of disease and discussed at some length the prognosis from information available in the literature.

C. H. Albaugh,
Reporter.

CHICAGO OPHTHALMOLOGICAL SOCIETY

November 20, 1944

Dr. Samuel J. Meyer, *president*

Amblyopia and suppression

Dr. F. Herbert Haessler presented a paper on this subject.

Some suggestions in differential diagnosis of muscle imbalance

Dr. Avery D. Prangen presented a paper on this subject.

Clinical meeting

(Presented by the Department of Ophthalmology, University of Illinois)

Kayser-Fleischer ring in hepato-lenticular degeneration

Dr. Hallard Beard presented D. K., a man, aged 23 years, who came to the neurologic clinic complaining of trembling of the extremities, slurring or mumbling speech, and stumbling gait. This had been progressive for six or eight years. A diagnosis was made of hepato-lenticular degeneration (Wilson's disease) and the patient was referred to the eye clinic.

The corrected vision of both eyes was normal. The eyegrounds were normal. The ring-shaped area of 1 mm. of the circumference of the cornea in the posterior layers was the seat of a striking pathologic change, known as the Kayser-Fleischer ring. Its prevailing color was a golden or bronze color. As seen by the slitlamp microscope it was made up of innumerable fine brown dots or granules disposed about the periphery on or just anterior to the posterior surface. The deposit was heavier along the lower margin.

Among the significant physical and

laboratory findings were enlarged liver and mildly positive Pandy reaction in the spinal fluid. The nature of the corneal deposits was considered to be metallic (probably copper or silver) as metallic deposits are found in the viscera, notably the liver.

External ophthalmoplegia and incipient cataract as a result of naso-pharyngeal cancer

Dr. Martha Rubin Folk presented T. N., a man, aged 60 years, who was seen in March, 1944, complaining of severe neuralgia of the left eye, drooping of the upper lid of the left eye, and inability to move the eye in all directions. A similar neuralgic attack three years ago had been treated with X ray with relief of symptoms.

The vision with the left eye was 0.4. There was a partial ptosis of the upper lid and slight discoloration of the skin. The eye was slightly sunken. The lens showed a club-shaped, grayish opacity in the anterior cortex. The retinal vessels presented some arteriosclerotic changes. The pupil was 4 mm. in diameter and did not react to light. There was limitation of motion of the eye in all directions.

After a total of 40 X-ray treatments there was improvement as to pain and external ophthalmoplegia, with better movement of the upper lid and also in internal rotation. A cataract of the left eye appeared after the course of X-ray treatments. In some cases of nasopharyngeal malignant tumors, neuralgia and ophthalmoplegia may precede other symptoms. In this case the diagnosis of cancer was made by the Ear, Nose, and Throat Department.

Angiomata of lid and orbit

Dr. Martha Rubin Folk said that a 21-month-old boy was brought to the hospital in June, 1944, because of drooping and swelling of the upper lid of the left eye which were noticed shortly after birth. No intelligent history could be obtained.

There was marked ptosis of the upper lid of the left eye and some difficulty in raising the lid for examination. Considerable hyperplasia was noted in the palpebral conjunctiva. A hard, cordlike blood vessel was palpable under the skin, extending from the outer canthus to the parotid gland. The left eye was down and in and did not follow movement of the right eye. There was 25 degrees of convergence with the perimeter for near. The pupil reacted to light and accommodation. No pulsation could be felt over the upper lid. X-ray pictures of the skull showed erosion and distortion of the outer table in the tempero-frontal region and rarefaction of the zygoma. Biopsy study of the upper lid showed an angioma with extensive edema and swelling of nerve fibers and inflammatory scarring.

On October 4, 1944, following treatment with radon seeds inserted into the eyelid, considerable regression of the lids was noted, and the temporal area had diminished in size to half the original finding. Lid surgery may be advisable when the child is older.

Capillary hemangioma of lid

Dr. Martha Rubin Folk presented V. G., a 17-year-old boy, who was admitted to the clinic in November, 1943. At birth a small pea-sized cherry-red nodule was noted on the upper lid of the right eye. Following pertussis and pneumonia at the age of 3½ years, the nevus enlarged to the size of a walnut. Vision had been good except for mechanical impairment which caused ptosis.

There was a 4- by 5- by 3-cm. violaceous mass, verrucoid and polypoid, of the upper lid of the right eye with protrusion of the bulbar conjunctiva to the size of an almond. A bruit was palpable,

synchronous with the radial pulse. By contracting the frontalis and levator muscles the patient was just able to peer through the opening of the palpebral fissure near the inner canthus. Visual acuity was 20/20 in both eyes. Tension was normal. Both fundi were normal.

Biopsy study of the mass showed that it was a capillary hemangioma. Other laboratory studies were negative.

Ligation of the supraorbital, supratrochlear, and branches of the superficial temporal vessel produced no result. Surgical removal was decided against, as the tumor was too vascular. In September, 1943, radon seeds were applied in a circular arrangement, followed by remarkable shrinkage of the mass to about one third of the original size, widening of the palpebral fissure, and disappearance of the bruit and protrusion of the bulbar conjunctiva.

Cataract associated with neurodermatitis

Dr. Martha Rubin Folk said that a woman, aged 33 years, was examined in October, 1944. She complained of rapid loss of vision of the left eye, with preceding blurring of vision six weeks ago.

At the age of nine years, dermatitis appeared, with remissions. She had had the usual diseases of childhood: measles, chickenpox, diphtheria, and scarlet fever. She had developed hay fever 10 years ago. The family history showed that both grandfather and great-grandfather had suffered from a "skin condition" and cataracts which caused blindness. The mother had eczema of the hands.

The only physical finding of significance was dermatitis of the forehead, neck, arms, and feet. The vision was R.E. 1.0; L.E. light perception and projection. Ocular movements were normal, irides blue, pupils reacted to light and accommodation, and conjunctiva was normal. The left eye showed anterior and posterior cortical opacities in the lens. A red reflex could not be obtained. The skin of the lids was dry and rough. Cataract extraction will be performed in the near future.

This patient showed an hereditary tendency from the mother's side, with a history of allergic manifestations since childhood.

Retinitis pigmentosa (field phase)

Dr. E. J. Horick said that L. B., a woman, aged 42 years, complained of failing vision, especially at night. The past history was without significance except that she had had a double sympathectomy, cervical.

The vision was R.E. 0.6−2, improved to 0.8−1 with −1.75D. sph.; L.E. 0.5−2. improved to 0.8−2 with −1.00D. sph. ⌯ +0.75D. cyl. ax. 180°. The muscle balance was normal. Examination of the eyes was negative except for a classical retinitis pigmentosa.

The visual fields in this disease vary from time to time, and there are periods of improvement and regression. About 10 years ago double cervical sympathectomies were performed; however, it did not seem that the field variations noted had any relation to the operations. Over a period of five years the fields of vision had improved and had then become worse. In this disease ring scotomata are due in theory to changes in the retinal vessels.

Multiple ring scotomata

Dr. E. J. Horick presented D. B., a 19-year-old girl, who was seen in April, 1941, complaining of diminution of vision, far and near, for two months. She gave a history of diphtheria and otitis media in 1928; rheumatic fever and carditis in 1938, with a good recovery; tonsillectomy during this period,

The vision was R.E. 0.2−1, corrected to 1.2 with +1.75D. sph.; L.E. 0.2.−1, corrected to 1.5 with +1.50D. sph.

She could not read with these. Homatropine refraction was as follows: R.E. +1.50D. sph.⊂⊃+0.25D. cyl. ax. 90°, vision was 1.2; L.E. +1.50D. sph. ⊂⊃ +0.25D. cyl. ax. 90°, vision was 1.2; add +2.00D. sph., each eye. The patient was given bifocals.

The visual fields showed ring scotomata, and on seven occasions during the next three years were always in agreement. The media and fundi were normal. General medical and special neurologic examinations were negative.

In September, 1941, the patient returned, saying that near work had to be held too far away. The near point was 20 inches. The bifocals were changed to +2.75D. sph. add and there had been no complaints since.

The visual fields were an unusual and unexpected finding, in the absence of any retinal disease. There was no defect of light sense, no night blindness, no awareness of the scotomata. The scotomata were thought to be functional.

A family of semi-albinos

Dr. Carl Apple showed four members of a family. The mother, aged 43 years, had five cousins with albinism and visual difficulties. The vision was R.E. 0.5−2, L.E. 0.8−3. The right eye tended to diverge when looking into the distance.

Homatropine refraction: R.E. +2.00D. sph. ⊂⊃ +0.50D. cyl. ax. 180°; vision 0.8. L.E. +2.00D. sph. ⊂⊃ +0.50D. cyl. ax. 90°; vision 0.8+.

H. D., a boy, aged 17 years, had a squint operation in 1943. The vision was R.E. 0.3, L.E. 0.3. The right eye diverged 35 degrees.

Homatropine refraction: R.E. +3.00D. sph. ⊂⊃ +2.50D. cyl. ax. 90°; vision 0.4−1. L.E. +3.00D. sph. ⊂⊃ +0.50D. cyl. ax. 90°; vision 0.5+3.

B. D., a boy, aged 8 years, had alternating divergent strabismus of 25 degrees. He had had a squint operation in 1943.

Homatropine refraction: R.E. +3.50D. sph. ⊂⊃ +2.00D. cyl. ax. 105°. L.E. +3.75D. sph. ⊂⊃ +2.75D. cyl. ax. 90°.

F. D., a girl, aged 13 years, had a divergence of 20 to 25 degrees of the left eye. The vision was R.E. 0.5, L.E. 0.2+1.

Homatropine refraction: R.E. +3.00D. sph. ⊂⊃ +2.00D. cyl. ax. 105. L.E. +3.00D. sph. ⊂⊃ +3.00D. cyl. ax. 90°.

Coloboma of the macula

Dr. Carl Apple said that M. C., a boy, had been in the clinic since the age of five years and was then placed in sight-saving classes at school. The left eye was microphthalmic, with 35 degrees of convergence. One muscle operation was performed in 1932. A cataract in the right eye was needled twice. There was marked nystagmus. A central, chorioretinal, heavily pigmented lesion was seen in the right eye, with pigment patches temporal to it. In the left eye there was a persistent hyaloid artery with choroidal degenerative changes.

In 1937 he had an attack of acute iridocyclitis in the right eye, and in 1939 a similar attack in the left eye which subsided in a few weeks. In 1941 the left eye again became inflamed, with the tension elevated to 43 mm. This was reduced with pilocarpine, but the pupil remained widely dilated.

Kahn test on both the patient and his mother gave negative results; the Mantoux test was also negative.

Melanosis

Dr. Stephen Sukumlyn said that M.B., a white woman, aged 48 years, complained in September, 1944, of poor vision in the right eye, pigmentation of the right eyeball since the age of nine years, migraine, and tenderness of the right frontal sinus for the past three months.

The vision was R.E. 0.4, L.E. 1.5−3 without correction. Retinoscopy after homatropine showed R.E. +0.50D. cyl. ax. 40°, vision 1.2−3; L.E. −0.50D. sph. ⊂⊃ +0.75D. cyl. ax. 15°, vision 1.2.

Routine laboratory tests and X-ray pictures of the sinuses showed no pathologic change. Slitlamp examination was negative. Ophthalmoscopic examination revealed no vitreous pathologic change in the right eye. The optic nerve was of normal pink color, round, the surface not elevated, the margins well defined except above, where there was slight blurring. Above the disc was a dark-gray pigmented patch of choroid extending upward for about 2 disc diameters, about 1 disc in width. There was a diffuse distribution of pigment in this patch except along the course of the vessels, where it was quite thin. Very thin flecks of pigment were seen in front of retinal vessels, but most of the pigment was deep to the retinal vessels. The periphery of the fundus temporally and especially in the lower quadrant of the temporal side was covered with numerous reddish, yellow, and white drusen. The fundus of the left eye was essentially negative.

Dignosis: Melanosis, retinochoroiditis juxta papillaris, and drusen. This was considered congenital in origin.

Robert von der Heydt.

NEW ENGLAND OPHTHALMOLOGICAL SOCIETY

November 21, 1944

Dr. Warren E. Kershner, *presiding*

Bacteriologic observations

Miss Anita B. Mangiaracine, bacteriologist at the Massachusetts Eye and Ear Infirmary, said that with the continued use of chemotherapeutic and antibiotic substances it was felt that an accurate bacteriologic knowledge of the infecting organism in cases of infection is essential in order better to treat the patient and to evaluate the drug. Routinely all cultures are set up aerobically and anaerobically, because it was found that about 50 percent of the strains of beta hemolytic streptococci and pneumococci can be first isolated only directly from the lesion, anaerobically. The smear is no longer used to establish a diagnosis of gonococcic infection. During the past year there have been 20 cases of meningococcic conjunctivitis, the smears on which showed intra- and extracellular gram-negative diplococci indistinguishable from gonococci. Because these patients can develop meningococcic bacteriemia and meningitis it is important to make the diagnosis and to watch them carefully for complicating symptoms. One of the 20 patients, mentioned above, went on to a full meningitis and two to the bacteriemic stage with beginning meningeal symptoms but no meningitis. Adequate chemotherapy averted this. The virulence of staphylococci is determined by the coagulase test. Virulent strains clot fresh human plasma and are toxin-forming; avirulent strains do not clot human plasma and do not form toxins. These are reported as coagulase-positive and coagulase-negative strains. As an example of the importance of differentiating between the two, the case of an infant was cited.

This child had a purulent conjunctivitis. Cultures showed a coagulase-negative hemolytic Staphylococcus aureus. Penicillin treatment was ineffective, so scrapings were examined for inclusion bodies. These were positive. The diagnosis of inclusion blennorrhea was made, and sulfa therapy led to immediate improvement and subsequent cure. Strains of beta hemolytic streptococci are typed according to Lancefield groups. This is important because the groups which are not susceptible to the sulfa drugs are susceptible to the action of penicillin.

Miss Mangiaracine concluded her talk by stating that these findings briefly point out that an accurate knowledge of the infecting agent allows the physician to make a better selection of the drug to be used and to evaluate its efficiency.

Nonsyphilitic interstitial lesions of the cornea

Dr. Edward E. Covitz reported that Mrs. M. B., aged 29 years, was seen at the Massachusetts Eye and Ear Infirmary two years ago with the complaint of a red and painful left eye of one month's duration, accompanied by blurred vision. The vision was R.E. 20/40, corrected to 20/20; L.E. 20/200, unimproved. The right eye was normal. The left eye showed circumcorneal injection, with the upper half of the cornea opaque, gray in color, and there was no superficial nor deep vascularization. The tension was normal. Syphilis and tuberculosis were considered, but repeated tests were negative. Family and marital history were noninformative, and a thorough and complete physical examination was negative.

The patient was not seen for 18 months. At this time she stated that the left eye had become blind six months previously, had been constantly painful ever since, and had affected the other eye, causing it to tear and blur. The right eye was not inflamed. The cornea was clear, tension and media were normal. Visual acuity was 20/20. The left eye was pale, the cornea totally opaque and light gray in color. Details in the anterior chamber were not visible. The tension became elevated, and light projection was faulty. Due to the patient's discomfort and hopelessness of ever obtaining useful vision, the left eye was enucleated in April, 1944. The pathologic report was lipodystrophy of the cornea. The interior of the eye was normal. There was no evidence of uveitis or iritis. The retina and disc were normal. The cornea was involved most markedly in the central portion. Bowman's membrane was intact. In the anterior sixth of the corneal stroma there were numerous calcific granules. There were cholesterin crystals and cells distended with lipoid granules. None of these deposits were immediately beneath Bowman's membrane. They were separated from it by newly formed, highly cellular fibrous tissue. The portion of the cornea just in front of Descemet's membrane was completely normal and free from infiltration, but the central part of the cornea was markedly infiltrated with chronic inflammatory cells and the stroma was replaced by vascularized fibrous tissue. There were no foci suggestive of tuberculosis or Boeck's sarcoid. A few Langhans cells were seen, although many of the cholesterin crystals were involved by giant cells, and after prolonged searching two giant cells were found elsewhere in the cornea. In May, 1944, the right eye began to have periodic attacks of slight ciliary injection and for the first time the cornea presented grayish infiltration at the periphery. Gradually this infiltration encroached upon the central area, and in September, 1944, the patient was admitted to the Massachusetts Eye and Ear Infirmary for further studies. Basal metabolic rate, blood calcium, blood cholesterol, blood phosphorus, and phosphatase tests

were made, and all were found to be within normal limits.

Duke-Elder, in discussing fatty degeneration of the cornea and lipodystrophy, states that in rare cases it may be due to an excess of lipoid materials in the blood. In the usual case the fat deposit is an uncontrolled accumulation due, in part, to faulty fat metabolism and in part to the deposit in visible form by degenerating cells of fat material normally held by the cell in invisible form. Fatty degeneration of this nature may occur secondarily or primarily; the first follows obvious damage to the cells and is not uncommon; the second, true lipodystrophy, is of an obscure nature, rare, and never presents the picture of an inflammatory disease. In short, this case clinically is the picture of secondary fatty degeneration of the cornea, and pathologically the picture of primary or lipodystrophy of the cornea.

Preliminary report on bilateral surgery in alternating strabismus

Dr. Albert N. Lemoine, Jr., said that because unilateral surgery—namely, recession—resection in one eye—had failed to give uniformly good results bilateral surgery was decided upon in a series of patients with alternating strabismus. During the past 11 months there have been 28 patients who have had bilateral surgery and an adequate follow-up. The preoperative work-up consisted of a refraction; measurement of the strabismus with prisms at distance and near, with and without glasses; the near point of convergence, with and without glasses; the screen concomitance test; measurement of the deviation in the diagnostic positions of the gaze. From these objective data the cases were placed in diagnostic groups before surgery. Following surgery, the patients' uncorrected deviation was measured again after one, three, six, and nine months. At the time of this preliminary report, 20 of the 28 cases showed a good result. By a good result was meant that the patient on the last visit had 10 or less prism diopters of remaining strabismus, with or without glasses and/or simultaneous macular perception as demonstrated with a red glass before one eye. Dr. Lemoine said it was, of course, too early to make a definite statement as to the ultimate results but thus far bilateral surgery in alternating strabismus had yielded encouraging results.

Mahlon T. Easton,
Reporter.

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COLONEL VAIL RETURNS AS EDITOR-IN-CHIEF

October, not January, should bring in the New Year for those of us who live in the north temperate zone. The greatest change of the year takes place then. Summer with its vacations, slower tempo, long lazy days, and open windows and doors is past. A tang courses in the air, schools reopen, a new zest enters our spirits, and we resolve that this year we shall do great things. We will rearrange our offices, start that research about which we had dreamed in the summer, and write that article that we have been postponing from year to year.

This fall the situation is somewhat different. A deep peace has entered into our souls. A glow of quiet happiness prevails. The war is over. The hectic period is past. Practice will soon be shared with those who answered the call to service, medical schools will drop their speed-up programs, and we may relax a little. "We shall rest, and faith, we shall need it, Lie down for an eon or two." But although most of us will be happy to have the pressure reduced, we have caught the habit of acceleration and can perhaps carry some of that over into greater accomplishments in our profession.

One of our duties that should be pleas-

urable is welcoming the ophthalmologists returning from service. Any who had a similar experience after the first World War will never forget the let-down feeling that follows so quickly the exhilaration of being home again and in civilian clothes. The practice that we thought was a pretty good one when we went away seems to have almost or quite disappeared. Our patients have gone elsewhere and only a few, God bless them, come back to us. So few seem even to know that we have been away. It is all a bit discouraging, but this feeling can be greatly alleviated by friendly and helpful colleagues. Let us try to make them feel our gratitude for having made this very great sacrifice for us.

Most ophthalmologists will return to take up where they left off. This is true, in so far as it concerns the American Journal of Ophthalmology, of the editor-in-chief, Colonel Vail. However, even in his case there will be the difference that his office will be moved to Chicago. With him, however, will go our loyal and efficient manuscript editor, Miss Emma S. Buss, without whose help during the past three years of Dr. Vail's absence the writer would have been unable to carry on the Journal. Since she joined the Staff, some thirteen or fourteen years ago, she has been an indispensable aid, and through the war years, when the acting editor was swamped with other duties, she has carried on almost alone.

A sincere tribute must be paid to the associate manager also, Miss Lucille Fromme, who has conducted the business of the Journal most efficiently in Cincinnati, so far removed for the past three years from the immediate help of the acting editor.

Colonel Vail's first two years as editor-in-chief showed his fine capabilities in that position. His three service years as Chief Ophthalmological Consultant to our army overseas will have given him the broadest possible viewpoint. Following induction and a brief preparatory period in this country, Colonel Vail was sent to England, where he was responsible for ophthalmic services in Army medical installations and where he became acquainted with the leading ophthalmologists of that country and observed the ophthalmologic techniques of the British Army that had already been at war for several years. He inspected all of our ophthalmologic units and advised with the Surgeon General's Office as to changes that might advantageously be made. He made a surprise visit to the United States in October of 1943, at which time he added much to the pleasure of the meeting of the American Academy of Ophthalmology and Otolaryngology, where he took his place in the Council. Returning to England after a few weeks in the country, he was there at the time of the invasion of France. Shortly afterwards he went across to oversee the establishment of the ophthalmic units in the Army of Invasion which covered all of France and Belgium, the German border, and England during that period. In charge of the spotting and placement of the mobile optical units, he was close to the front at times and thus became familiar with the immediate as well as remote ophthalmic service to the injured. He returned home to help in planning the rehabilitation of service men with ocular casualties and interested himself officially in the program for the war-blinded. At the end of 1944 he became Chief Ophthalmic Consultant to our forces in this country and was succeeded overseas by Lieutenant Colonel James Greear, who had been in charge of ophthalmologic rehabilitation at the Valley Forge Hospital.

In January of this year Colonel Vail resumed a part of the duties of chief editor of the Journal and is now ready to

take full charge. After much deliberation he decided that he would leave his home in Cincinnati, where he had succeeded his distinguished father and had established an enviable reputation for himself, and accept the appointment as Professor of Ophthalmology on a part-time basis at Northwestern University Medical School, as offering greater opportunities for teaching and research. To make this decision must have required great courage, for anyone who has built up a large practice knows what effort this has required and how long it has taken, and to abandon it for an ideal is not easy. Nevertheless, every man who has a large practice knows how its octopuslike tentacles seize and hold him fast. Year by year it becomes harder to find time for teaching and research. His obligations increase and he is unable to do without the increased income that the larger practice brings. About one man in a thousand has the courage to let the larger viewpoint prevail.

The once-more-retiring editor congratulates Colonel Vail and in welcoming his return as editor-in-chief on active duty with the Journal looks forward to a better publication that will attract an ever-increasing number of readers and contributors.

Lawrence T. Post.

A REVIEW OF SOLAR RETINITIS AS IT MAY PERTAIN TO MACULAR LESIONS SEEN IN PERSONNEL OF THE ARMED FORCES

The question of increased incidence of macular lesions in service personnel has been eminent in the minds of military ophthalmologists since the war began. Analyses of some of the cases have been presented recently by Cordes[1] and McCulloch.[2]

As these authors emphasize, the etiology of many of these macular lesions is not certain. There is no doubt but that a great part of the increase in incidence observed is not real but made apparent only by the frequent screening examinations done in the services. For instance, McCulloch found 7 instances of old eclipse burns in 1,000 routine examinations. The writer has seen 5 old eclipse burns during two months of routine examinations in an Air Corps Regional Hospital Clinic where approximately 2,000 new patients were seen. Many patients are examined who ordinarily would not seek ocular advice. It is not uncommon to find service men with small macular holes, having 20/20 to 20/30 vision in the involved eye. These patients are frequently unaware of any abnormality until they are subjected either to use of their eyes under unusual conditions, or to special examination intended to demonstrate a minimal scotoma.[2] Such conditions of unusual use of the eyes would include sighting through a small aperture as with a range-finder, gun, sextant, or microscope. Most annoying to the examiner seeking the etiology is the lack of awareness on the part of these patients as to the time and circumstances of onset of the lesion.

The common causes of macular disturbances in this age group are: familial macular degeneration; solar retinitis; trauma, as contre coup injury; bacterial, toxic, and allergic factors including id responses as might occur after inoculations; and finally angiospastic retinopathy. It seems conceivable that any of these conditions might have produced a small macular lesion, the subjective symptoms of which were slight and of short duration, the original cause often being forgotten, particularly if the condition occurred at an early age. All ophthalmologists have seen minimal lesions in patients who, only after careful question-

ing, admitted having looked at an eclipse or having suffered a blow to the eye followed by a definite scotoma, but who had quite forgotten the attendant circumstances until reminded of a possible relationship. Of particular importance to military ophthalmologists is the possibility of magnifying, in the patient's mind, a preëxistent minimal lesion by repeatedly calling attention to it in successive examinations until the patient appreciates it as grounds for avoiding unpleasant duty.

With recent lesions one would expect the patient to remember the onset of a scotoma and circumstances preceding it. Exceptions would be in cases with an extremely insidious onset, as occurs in certain degenerative conditions or might occur with a subclinical injury cumulative in nature.[3] The history is then only a guide for differentiation of service-connected lesions from those existing prior to entrance into the service.

An especially interesting and significant group of cases would be those with macular lesions associated with an indefinite history of onset in personnel known to have had careful and complete qualifying physical examination. This would include certain groups of officers as pilots, bombardiers, navigators, and others, and would indicate more significantly the frequency of occurrence of degenerative lesions or cumulative subclinical injuries occurring in service. As yet there has been no general cataloguing of cases in a way that emphasizes particular etiologic groups. Cordes[1] has started such a correlation and evaluation of cases with Navy ophthalmologists and concludes that there is one group definitely related to angiospasm.

In addition, Cordes briefly discusses solar retinitis. Although a lesion on this basis may appear clinically to be extremely variable, it nevertheless lends itself readily to critical analysis, a situation not generally appreciated in its entirety. For this reason, and because the circumstances of modern warfare might lead to an increased incidence of solar retinitis, the subject is reviewed. It is reasonable to assume that excessive exposure to radiation occurs in gunners, navigators, aircraft spotters, and those fighting in the tropics or where there is constant reflected glare from water or sand or snow, or in extreme cold or at high altitude where radiation is intensified.

HISTORICAL (Taken in part from the review by C. B. Walker[4])

This syndrome has been described under various synonyms of eclipse blindness, retinal dazzling, scotoma helieclipticum, retinal solar erythema, solar retinitis, and the like. That blindness may result from direct observation of the sun of eclipses has been known, without doubt, for ages. Galileo is known to have injured his eyes by observation of the sun with his telescope. Galen recites cases of blinding with more or less subsequent return of vision in observers of eclipses of the sun. He also noted that central scotoma or blindspots often resulted in the same way. Reid, in 1761, and Soemmering, in 1791, probably gave the first accurate descriptions of the phenomenon of sunblinding. Less frequently, but of more importance to the present discussion, the same ocular disturbances have long been noted in seamen exposed repeatedly to strong reflection of the sun's rays from water surfaces, as when a small boat is being steered into the sun's "eye," or to the brilliant reflection of light into a sextant in which the eyepiece has not been darkened. Travelers over desert sands or glary plains are not uncommonly afflicted with visual disturbances. Elliot[5] reports a case of typical solar retinitis, indistinguishable from that met with in eclipse patients, in a patient who on one occasion had to

ride for several hours in the early morning alongside of paddy fields "lying under water with the sun strongly reflected from them onto his left eye."

A different type of lesion from the sun's rays is described by Jess[6] and by Zade.[7] Zade found, in World War I, in five of nine aviation officers and in a large percentage of anti-aircraft gunners, a ring scotoma extending 35 to 50 degrees from the fixation point and only a few degrees wide. In 150 cases of "dazzling" in the regular army Zade found no scotoma, whereas in 160 cases in the aircraft service 31 showed scotomata. These were found mostly in the crews of antiaircraft gunners. The scotomata were peripheral and in the lower fields. To date these findings have not been corroborated in the present war.[8]

EXPERIMENTAL (Quoted freely from the monograph by Verhoeff *et al.*[4])

Czerny, as early as 1876, showed that a lesion of the retina of the rabbit, visible with the ophthalmoscope, could be produced by the sun's rays. By using a concave mirror and glass-lens system he concentrated sun's rays which had traversed a 20-cm. water–heat-filtering tube into the eye of a rabbit for 10 to 15 seconds. The region of the retinal image on exposure was found to be whitened and seared. Section under the microscope showed what he described as a coagulation of the albuminous substances of the retinal elements. Deutschmann, in 1882 using a convex lens to transmit the sun's rays reflected from a concave mirror, separated the distance between the two so as to equal the sum of their focal lengths and so was able to throw parallel light into the atropinized eye of the rabbit and produce a typical lesion even after a few second's exposure. To determine the influence of heat he passed the rays through a tube of clear running water 20 cm. long. The changes could be produced but it always took a few minutes longer. He concluded that both heat and light were active as etiologic factors. This analysis of heat and light effects has subsequently been disproved. Later, other workers attempted to determine which part of the spectrum was responsible in producing the lesion. Widmark (1892) studied the effects of ultraviolet light on the retina and found no significant retinal lesions. Aubert (1900) was inclined to disregard the heating effects in sun-blinding, since he found that a thermometer held in sunlight concentrated by a 40-diopter diaphragm lens only registered 1 to 2 degrees' increase in temperature. Hertzog (1903) produced lesions in rabbit's retina which he ascribed entirely to heat. Birsch-Hirschfeld, in 1909, repeated Aubert's experiment and then showed that 50-degree paraffin, in thin layers on black paper, when exposed to sunlight, as retina would be in sun-blinding, melted in a few seconds; but when white paper was used under the same conditions several minutes were required to melt the paraffin, thus demonstrating simply the production of heat from absorption of light rays by black retinal pigment. This emphasized the fact that light must be absorbed to be effective. Presumably Aubert's thermometer either reflected or transmitted enough of the sun's rays that absorption was insufficient to raise the temperature.

It remained for Verhoeff and Bell[4] to give us the most complete understanding of eclipse blindness in their classical monograph on effects of radiation on the eye. A small part of this monumental work was devoted to experiments artificially producing eclipse blindness in animals and examination of the lesions produced with special reference to the kind and intensity of radiation required to produce the lesions noted.

By using various means of focusing the

sun's rays into the eyes of rabbits and monkeys, plus the use of artificial sources of light, and of various filters and absorbing media to break down the spectrum into its components, they conclusively proved that "the effects known as eclipse blindness are wholly thermic, due to the intense concentration of the solar energy upon the retina by the refracting system of the eye itself, forming an image of destructive intensity." Approximately 113 $\times 10^6$ ergs (approximately 4 calories) per square centimeter per second was calculated to be the concentration of energy in the image when looking at the sun unscreened. Even if only one half or one fourth of this amount of energy were available, as in the case of a partially eclipsed sun, the immense concentration of energy in the image would still be sufficient to produce destructive effects. Experiments by Eccles and Flynn[9] demonstrated that retinal lesions usually occur when radiant energy falls on the retina for 30 seconds at a rate of 70 calories per square centimeter per minute, but not when the rate is 40 calories per square centimeter per minute. There is rough quantitative agreement between their results and those of Verhoeff.

The effects were not the result of abiotic damage due to the ultraviolet end of the spectrum since the experiments of Verhoeff proved that insufficient ultraviolet light reaches the retina to do any immediate harm. The cornea obstructs practically all energy of wave length less than 295mμ and the lens the remaining ultraviolet to wave length 380 to 400mμ. They were not the result of the infrared end of the spectrum, since the energy in this region of the solar spectrum is low and reaches the retina only in part, insufficient to produce heat enough to cause damage. Up to the present time no one has shown that the infrared radiation has any effect on tissue other than heat, and the small band of infrared starting at the end of the visible spectrum, 760 on up to 1,200mμ where it is entirely absorbed by water, could supply but a small amount of energy.

There remains then the energy of the solar spectrum, the greater part of this energy lying within the visible spectrum (760 to 400mμ), which traverses the media of the eye and the retina to be absorbed in the pigment and there degraded into heat sufficient to produce a destructive lesion, distinguishable under the microscope from an abiotic lesion. This lesion spreads in both directions, forward through the retina into the rods and cones, and backward into the choroid.

The concentration of energy in images, as on the retina, obviously depends on the amount to which superficial energy is concentrated by the refractive media, and by the size of the aperture of the refracting system, determined by the size of the pupil. If the source of energy is extended as in reflection from large surfaces, as sea or desert, the image is correspondingly extended and the concentration of surface energy in the image is correspondingly reduced. Contrariwise, if the source is small the image density is relatively greater. Within limits then, intensity of effects on the retina is directly proportional to the intrinsic brilliancy or radiation per unit area of the source.

Aschkinass has shown that the general absorption of the media of the eye for radiant energy is closely similar to that of water in a layer of equal thickness. Whereas the cornea and lens absorb the rays of ultraviolet light the water content of the eye absorbs the greater part of the infrared radiation, and only the waves from the visible spectrum traverse the eye to the retina, longer wave lengths being more than 90 percent absorbed. Consequently, radiation from low-temperature sources, like carbon incandescent

lamps and ordinary flames, is practically absorbed before it reaches the retina. It is quite different, however, with radiance like that from the sun, which is equivalent to that from a body 5,500 to 6,500 degrees absolute as regards the character of its radiation. From such a source the specific absorption of water cuts off relatively little and the total loss of energy in the eye is in the order of magnitude of 25 to 30 percent. In phenomenon like eclipse blindness not only is the eye exposed to a powerful radiation source but the radiation is of such a character that it is not absorbed and hence the energy in the image may rise to great intensity.

From their experimental data Verhoeff and Bell[4] calculated that the critical period for development of eclipse blindness is, with close fixation, of the order of magnitude of a minute or less and exposure of even a few seconds would be highly dangerous were it not for the extreme miosis (pupillary diameter 1.6 to 2 mm.) set up when looking at the sun, and the wandering of the image on the retina. Rapid shifting of the focal image on the retina gives the tissue opportunity for cooling, so that if fixation at a certain point is not long enough to produce destructive effects little permanent damage can be done, although the scotomata may be severe.

Histopathology

In rabbits the spots produced by sunlight were about 2.5 mm. in diameter as measured under the microscope with reference to the effects on the pigment epithelium, but only about 1 mm. when measured with respect to the effects on the retina proper when this was involved. The most striking features of all the burned areas whether due to short or long exposures was their sharp demarcation indicating how sharply critical is the temperature required to injure tissues. The pigment epithelium was the most severely injured of any portion of the retina, and in the slightest burns it alone was affected. The rods and cones, choriocapillaris, and outer nuclear layer were affected in this order. The inner nuclear layer, the ganglion cells, and the nerve-fiber layer were affected only after extremely intense exposures, and in the experiments were not affected after exposures to the magnetite arc but only when concentrated sunlight was used. The layers of the retina were disintegrated or coagulated depending on the degree of heating. Two months after exposure the retina was found replaced by neurogliae containing wandering pigment cells. In some cases the choroid was apparently normal and the pigment epithelium reformed. In others the latter was absent and the choroid replaced by two or three layers of fibrous vascular tissue. It is to be noted that the extreme effects produced experimentally in the rabbit would only rarely, if ever, be encountered clinically in man, for the light was concentrated by use of a concave mirror, transmitted through a dilated pupil, and the time of exposure longer than would occur clinically.

Pathogenesis

To recapitulate, it is seen that the sun's rays have no effect unless they are absorbed. This absorption does not take place in the eye until the retinal pigment is encountered. Here the light is absorbed and converted into heat which may be sufficient to injure only the pigment epithelium or may extend both forward and backward to injure the choriocapillaris or neuroepithelium and inner retina. However, the width of the lesion is nicely demarcated owing to the fact that the critical temperature necessary to injure tissue is definite and the heat is concentrated in the center, owing to the nature

of the image, and is dissipated rapidly from the periphery through the circulation.

The length of exposure causing injury when one looks at the sun is calculated to be in the neighborhood of a few seconds.[4] Eccles and Flynn[9] from their experiments on rabbits conclude that momentary glances across the sun will not produce retinal lesions. Results of exposure under diverse conditions would vary according to the time necessary to develop heat effects. Looking through a glass or filter or exposure to reflected sunlight or other sources or radiation as arc light, incandescent metals, and so forth, will damage the retina only if the effective amounts of heat are generated. Eccles and Flynn[9] showed that effective amounts (70 calories per square centimeter per minute) were received by the retina through a 2-mm. pupil in 30 seconds, causing demonstrable lesions, whereas ineffective amounts (40 calories per square centimeter per minute) were received through a 1-mm. pupil in the same length of time, causing no demonstrable lesions. It is quite possible, then, for so-called "protective" glasses to allow dilatation of the pupil to the point where radiation received by the retina is actually greater than it would be without the glasses because the absorptive qualities of the lens do not compensate for the amount of radiation transmitted through the increased pupillary aperture. No doubt many macular burns have been sustained under such circumstances of false sense of protection.

Because of the retinal circulation, heat generated in the retina does not accumulate, and, therefore, repeated exposures, each producing rise in temperature below the point at which injury to the tissue occurs, would have no effect even though repeated many times. Verhoeff's experiments indicate that as far as the retina is concerned heat effects alone follow exposure to solar radiation. He shows that all the ultraviolet and most of the long infrared radiation is absorbed before reaching the retina. More recently Duke-Elder[10] cited experiments in which retinal changes were produced by severe exposures to ultraviolet light. His interpretation was that repeated subcritical amounts of ultraviolet radiation might produce cumulative pathologic effects. The 150 cases of macular lesions reported by Smith,[3] and believed by him to be instances of solar retinitis, occurring in the South Pacific, are interesting from this point of view. The possibility of photosensitizing substances being present in the circulation and retinal tissue and/or undue sensitivity, as allergy, to certain rays, thus allowing greater effect from radiation than would ordinarily be expected, must also be considered.

Clinical description

The clinical picture of solar retinitis recorded in the literature seems to be extremely variable and incongruous, but the preceding consideration of the pathologic lesions produced experimentally explains this apparent variation and makes it quite understandable. The immediate signs and symptoms, varying from marked to negligible changes, depend entirely on the nature of the exposure as to time and severity, pupillary size, and overlapping fixation. Cumulative effects from repeated exposures must be considered to be in the realms of possibility if effects from radiation other than those attributable to heat are ultimately proved to occur in the retina.

It remains for us to set up a clinical picture and diagnostic criteria consistent with the clinical findings in known cases and with the experimental pathologic changes so as to determine which will be

important in differentiating solar retinitis from other macular lesions.

These criteria are:

1. SCOTOMATA. (*a*) *Acute stage.* Immediately following exposure there is a sharply defined positive central scotoma which may be severe but is characteristic in the rapidity and extent of its clearing. For instance, patients are often not concerned about the scotoma, believing that it will go away in a few hours, and when they awake the following day and a scotoma is no longer noticeable the episode is easily forgotten. Frequently patients will not report to an ophthalmologist for three or four days after exposure, being concerned only when the scotoma persists. The question of peripheral scotomata, 20 to 50 degrees out[11] has not been corroborated generally but should be looked for in the future.

(*b*) *Late stage.* In the late stage an extremely minute central or paracentral or no scotoma persists. Vision usually varies from 20/70 to 20/50 or is normal. The scotoma is negative and may require special techniques for its demonstration, such as the use of blue test objects at 2 or 3 meters' distance and a mirror or prism apparatus to separate the visual lines between the two eyes so that the good eye may be used for fixation while the affected eye is tested for the scotoma.[2] There is rarely complete loss of central vision. Even in cases presenting an actual hole in the macula one may have 20/20 vision but complain of the fixated image, as letters on the test chart, disappearing, especially if sighted through a small aperture. Of course, this is characteristic of a small scotoma of any origin.

2. OPHTHALMOSCOPIC PICTURE. In general the ophthalmoscopic picture shows a localized lesion varying within small limits in its diameter but with more variability as to its depth, understandable from the fact that it starts in the pigment epithelium and spreads forward and backward depending on the intensity of the heat. The confinement of the lesion to such a small radius, the adjacent retina being unaffected, as well as the absence of injury to other parts of the eye is a distinguishing feature. Other macular disturbances are seldom so completely localized.

(*a*) *Acute picture.* Theoretically and experimentally this may show extremes in the depth and severity of the injury as varying from a practically normal macula to one which shows a white seared fovea with hemorrhages. The latter, although possible, would be most unusual. The usual degree of involvement reported clinically, as in Birch-Hirschfeld's[12] 50 cases of acute eclipse phenomena, is a macular area, grayish and opaque, with veiling of the details and an intensifying of the pigment granulation. The foveal reflex is usually enlarged and sometimes there are some minute whitish spots in the damaged zone. In deeply pigmented fundi[13] a maroon or bronzed to crimson zone around the fovea is described, irregular in shape but sharply edged, often surrounded by pigmentary disturbances described as a "smoke-cloud" appearance. Mild hyperemia of the disc has frequently been noted and would be expected as a change secondary to the retinal injury.

(*b*) *Late stage.* At this stage changes vary from a slight plaquelike depigmentation of the foveal area, which may or may not be mottled, to a hole in the retina with minor pigmentary changes surrounding this. The light reflex may be altered and often appears to be replaced by one or two yellow spots which differ from the light reflex in that they are most distinct when focused at the retinal level and do not move with movement of the ophthalmoscopic light.[2]

3. EYE INVOLVED. Involvement of one

or both eyes depends on the circumstances under which exposure takes place. In Wright's[13] series of 21 cases of eclipse amblyopia, seen 1 to 31 days following exposure, both eyes were involved in 15 instances, whereas under circumstances wherein a monocular instrument is being used only one eye would be involved.

4. Course. The unlikelihood of remissions and exacerbations of symptoms of scotoma in solar retinitis in contradistinction to macular lesions from angiospastic phenomenon is of diagnostic significance. Recurrence or progression are conceivable on exposure to radiation only if one assumes that cumulative effects are possible. As yet the evidence against this assumption overbalances that in its favor.

To summarize: the diagnosis of solar retinitis can be made in the presence of a sharply demarcated, small, nonprogressive, nonrecurrent lesion of the macula in an eye in which there is no evidence that the causative agent has produced any other lesion; in an individual giving a negative history of concussion injury, a negative family history for macular disease, and a positive history of exposure to excessive radiation.

Treatment is mainly preventative and in the Armed Forces this could be accomplished by orientation courses regarding the effects of radiation on the eyes and how to use the eyes to avoid excessive exposure, and by the use of protective devices under circumstances wherein damage by radiation is imminent. Such protective devices for use where it is necessary to look into the sun would be glasses with high absorption powers for both visible and infrared radiation, for example, welder's glasses conforming to accepted specifications of the American National Bureau of Standards.

No doubt of all the macular lesions seen in the Armed Forces, solar retinitis constitutes but a small percentage. Nevertheless, it forms a characteristic group that can be rather definitely diagnosed, and for this reason the pathogenesis and character of the lesion have been reviewed.

S. Rodman Irvine
Major (MC)

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RETINAL AND GENERAL CIRCULATION

Very early in the development of the human embryo, the elements from which will later arise the optic nerve and retina are demonstrable as a part of the forebrain. The optic pits, minute depressions in protrusions of neural ectoderm at the front end of the neural plate, are symmetrically paired from the time of their

original appearance, one on each side of the neural groove, at "that portion of the upper surface of the head fold which is in direct contact with the surface ectoderm" (Mann: "Development of the human eye"). This pairing of the optic pit is cited as opposing the suggestion that the eye was originally median, or cyclopic. The proximity to the surface ectoderm is of course important in relation to subsequent formation of the crystalline lens.

A little later, the optic pit develops into the optic vesicle, the invagination of whose lateral (subsequently anterior) half into the median (later posterior) half forms the optic cup, the two halves of which constitute, respectively, the pigment layer and the neural layers of the retina.

Thus the optic nerve and retina are essentially a part of the brain. Their blood vessels, like other blood vessels, are derived from the embryonic mesoderm. Their arteries share with those of the rest of the brain the distinction of being end arteries, ordinarily free from anastomoses. This is a fact of vital importance as to the devastating effect of arterial obstruction.

Apart from biomicroscopic study of the conjunctival circulation, ophthalmoscopy affords the only opportunity to view under considerable magnification the condition and behavior of living human blood vessels. Perhaps even more important is the fact that with the ophthalmoscope we view a part of the cerebral circulation. Circulatory changes in disease do not always involve uniformly all parts of the brain, including the optic nerve and its retinal expansion. But vascular changes in the retina are always significant or suggestive in study of the disease processes which involve or may involve the brain.

Among important recent writers on retinal circulation, it is probable that none has contributed more to our intimate knowledge of the subject than Bailliart. Let us recall that this author was a pioneer in the measurement of retinal arterial and venous tension. His ophthalmodynamometer was presented in 1917. With Magitot he proceeded to set up curves by means of which the tension could be calculated in relation to the point where pressure upon the eyeball caused first the appearance, and later the disappearance, of arterial pulsation.

Prior to the outbreak of the recent world upheaval, Bailliart's most comprehensive review of his own work and the work of others in this field was the official "report" presented to the Cairo Congress of Ophthalmology in December, 1937 ("L'hypertension artérielle rétinienne," XV Concilium Ophthalmologicum, Cairo, 1938, volume 1, page 87). To the same Congress were presented, also as official "reports," a study by Wagener and Keith on "Diffuse arteriolar disease and hypertension," and one by Koyanagi entitled "Veränderungen an der Netzhaut bei Hochdruck; pathologische Anatomie."

An interesting first-fruit of the end of the war with Germany is the recent receipt of a series of issues of La Presse Médicale, one of the world's oldest and most respected weeklies (pre-war, twice weekly). Most of these numbers were published during the German occupation of Paris, a few of them after the precipitous German retreat. In the issue of November 18, 1944, Bailliart published a picturesquely written article entitled "The prognosis of arterial hypertension judged according to some retinal aspects."

Bailliart reminds his readers that, alike for ophthalmologists and for other physicians, the structural and functional condition of the central artery and vein of the retina—"veritable cerebral vessels"—is at least as interesting as that of the humeral or the radial artery. In this short essay he raises the important question

whether the retinal tree may not furnish evidence as to the part played by peripheral resistance in the origin and maintenance of that arteriolar disease which, in the opinion of Wagener and Keith, is the cause of hypertension.

The patient with general arterial hypertension is seldom entirely free from vascular accidents involving the retinal vessels. The exact significance of these retinal signs, as affecting general prognosis, may not always be clear. Yet even slight edema of the optic disc may correspond to a similar condition within the brain. Thrombotic occlusion of a retinal vein may be the first manifestation of apoplexy.

"Receiving the blood under abnormal pressure," says Bailliart, "the capillaries at first resist the surcharge by contraction of their walls; they absorb a part of the pressure . . . In the long run, if unaffected by obliteration, they yield and dilate; thenceforward the blood column . . . forces the extensible veins; the blood stagnates, blood elements and plasma escape; the retina, in a blood inadequately renewed, is inadequately nourished." To find such a condition in the retina is to know that it may develop elsewhere in the cerebral vascular network.

It is important to remember that in serious cases of vascular hypertension the diameter of the retinal arteries may appear normal although their caliber is greatly reduced. In biopsy of the arterioles of the pectoralis major muscle, Wagener and Keith have shown that, while the thickness of the vessel wall is normally equal to one half the caliber, the relative measurements are inverted in severe forms of hypertension.

Certain measurements quoted by Bailliart in his Cairo "report" are worthy of repetition. The only vessels ophthalmoscopically visible are arterioles. With rare exceptions near the macula the capillaries are invisible, because they turn at right angles to the retinal vessels and into the internal layers of the retina. They cannot be more than 200 microns (1/125 inch) long. The thin muscular layer of the arteriolar wall gradually thins out, and the wall of the capillary is a single layer of endothelial cells of much greater length than width. Only one cell can pass at a time, often deformed by pressure. The capillaries do not necessarily undergo anatomic change in disease, although probably affected by pathologic chemical changes in the surrounding or contained fluids. They must be supposed to gape under pressure, and probably either undergo spasmodic contraction or become at times impervious by reason of arteriolar atony. In aged persons, the capillaries become impermeable with greater relative frequency than in younger subjects. These variations may be supposed to explain many cases of migraine or transient blindness in vascular hypertension.

As indicated by retinal sphygmometry, Bailliart states the range of minimal (diastolic) pressure in the normal subject as from 35 mm. of mercury in the papillary artery to 20 mm. in the papillary veins. Thus a drop of 15 mm. is necessary to keep constantly open the last arterioles and the capillary network, or in other words to overcome friction and the hydrostatic thrust of the vessel against the retinal tissue.

Modern medical education tends more and more to recognize the importance of imparting to the medical student a practical familiarity with ophthalmoscopy. A much more intimate experience in retinal diagnosis is essential to the internist and the neurologist. Above all others the ophthalmologist must be conversant with the pathologic anatomy and the prognostic significance of changes in the retinal vessels.

W. H. Crisp.

ABSTRACT DEPARTMENT

EDITED BY DR. WILLIAM H. CRISP

Abstracts are classified under the divisions listed below, which broadly correspond to those formerly used in the Ophthalmic Year Book. It must be remembered that any given paper may belong to several divisions of ophthalmology, although here it is mentioned only in one. Not all of the headings will necessarily be found in any one issue of the Journal.

CLASSIFICATION

1. General methods of diagnosis
2. Therapeutics and operations
3. Physiologic optics, refraction, and color vision
4. Ocular movements
5. Conjunctiva
6. Cornea and sclera
7. Uveal tract, sympathetic disease, and aqueous humor
8. Glaucoma and ocular tension
9. Crystalline lens
10. Retina and vitreous
11. Optic nerve and toxic amblyopias
12. Visual tracts and centers
13. Eyeball and orbit
14. Eyelids and lacrimal apparatus
15. Tumors
16. Injuries
17. Systemic diseases and parasites
18. Hygiene, sociology, education, and history
19. Anatomy, embryology, and comparative ophthalmology

1

GENERAL METHODS OF DIAGNOSIS

Fink, W. H. **An evaluation of visual-acuity symbols.** Amer. Jour. Ophth., 1945, v. 28, July, pp. 701-711; also Trans. Amer. Ophth. Soc., 1944, v. 42, p. 49 (6 figures, references.)

Koch, W. **A new instrument for dark-adaptation tests.** Brit. Jour. Ophth., 1945, v. 29, May, pp. 234-243.

A simple, relatively inexpensive apparatus which is easy to construct is described. (2 photographs, 3 diagrams, references.) Edna M. Reynolds.

Lillie, W. I. **Head and face pain.** Trans. Amer. Acad. Ophth. and Otolaryng., 1944, 49th mtg., Sept.-Oct., pp. 15-17.

Pain and temperature sensations from the trigeminal area are received exclusively by the spinal tract and its nucleus. Probably both the main sensory and the spinal nuclei are concerned in tactile sensibility. The pain threshold in man is relatively uniform and stable, and is independent of age, sex, emotional state, and fatigue. Lowered pain threshold is associated with hysteria and malingering, but is rarely, if ever, due to a structural disorder of the nervous system. The latter causes no change in the pain threshold, or raises it. The cornea perceives only pain and cold, while touch is absent. Pinching, sticking, or cutting the extraocular muscles does not cause pain, but traction on them produces immediate pain localized deep in the orbit. Pain from the iris is produced only by traction and is referred to the eyeball itself. If of sufficient intensity, it will spread over the ophthalmic division of the fifth nerve as does pain from increased intraocular pressure. In eyes with normal irises, abnormal amounts of light never produce true pain, but rather slight discomfort. All the tissues covering the cranium are more or less sensitive to pain, the arteries being especially so. The cranium, the parenchyma of the brain, most of the dura and pia-arachnoid, the ependymal lining of the ventricles, and the choroid plexus are not sensitive to pain. The intracranial structures, such as the

venous sinuses and their tributaries, parts of the dura at the base, the dural and the cerebral arteries at the base of the brain, the fifth, ninth, and tenth cranial nerves, and the upper three cervical nerves are pain sensitive.

Traction, displacement, distention, and inflammation of the cranial muscular structures are chiefly responsible for headaches. Increased intracranial pressure is neither a prime nor an essential factor in the production of headache. Brain-tumor headaches result from traction upon the larger arteries, veins, and venous sinuses, and upon certain cranial nerves, either by local traction adjacent to the tumor or by displacement from distant traction. Headaches associated with migraine and arteriolar hypertension are related to changes in the pulsation amplitude of the cranial arteries, chiefly branches of the external carotid. Headaches of ocular origin are usually produced by uncorrected hypermetropia and astigmatic and muscle imbalances. Any lesion which can produce traction, displacement, distention, or inflammation of any of the structures supplied by the ophthalmic division of the trigeminal nerve has the potentiality of producing pain, varying in degree from a slight uneasiness to extreme distress. (References.) Charles A. Bahn.

Lloyd, R. I. **Binocular and red-free ophthalmoscopy.** Amer. Jour. Ophth., 1945, v. 28, July, pp. 725-729; also Trans. Amer. Ophth. Soc., 1944, v. 42, p. 210. (3 figures, references.)

Lyle, D. J. **Charts for recording lesions affecting the visual system.** Trans. Amer. Acad. Ophth. and Otolaryng., 1945, 49th mtg., pp. 241-242.

The author reproduces two diagrammatic drawings showing horizontally and laterally the structures of the visual system, each diagram accompanied by a visual-field chart for comparative record of the case.

Weiss, C., and Shevky, M. C. **Clinical bacteriology and cytology of some ocular infection.** Amer. Jour. Clin. Path., 1944, v. 14, Nov., p. 567.

Bacteriologic and cytologic findings in 136 cases of acute and chronic eye infections are given. Included is a case of orbital infection due to Torula histolytica which is the second of its kind in the literature. The results of this type of examination are useful in determining the most effective therapy for conjunctivitis. By careful cultures preoperatively the incidence of intraocular infections following surgery can be lessened.

Robert N. Shaffer.

2

THERAPEUTICS AND OPERATIONS

Chutko, M. B. **Hexenal narcosis in ophthalmic surgery.** Viestnik Oft., 1942, v. 21, pt. 5, p. 39.

General anesthesia is often indicated in ophthalmic operations because of special behavior, lack of sensitiveness to local anesthetics, and the patient's psychology. The objections to inhalation narcosis are not valid for hexenal (U.S.S.R. brand of evipan sodium). Intravenous use of it at the front became necessary because of danger from local retrobulbar anesthesia in the presence of infections or because the need for careful removal of all traces of uvea in crushing injuries prolonged operations. Its first use was in the Finnish war. The wounded preferred it and insisted on it. In children it has been found to permit extraction of

cataracts where formerly only discisions were practicable.

M. Davidson.

Moreu, Angel. **Modern anti-infectious treatment in ophthalmology.** Arch. de la Soc. Oft. Hisp.-Amer., 1944, v. 4, May-June, pp. 392-396.

Chemotherapy with albucid is indicated in two types of case, serpiginous ulcer and purulent iridocyclitis. In the former, atropine and dionine are used locally, and 10 c.c. of milk is given together with large doses of albucid. Twenty-four hours later 2 c.c. of blood is taken from the vein. The anterior chamber is evacuated by a small paracentesis and is refilled with the patient's blood, which by this time contains a high contentration of antibodies and sulfonamide. A contact glass is filled with the blood and applied to the eye. This treatment has proved efficacious in 12 cases. With good results, two cases of purulent iridocyclitis were treated in the same manner, except that the contact glass was not used.

J. Wesley McKinney.

Plastinin, N. V. **Intramuscular hexenal narcosis in practice on children.** Viestnik Oft., 1942, v. 21, pt. 5, p. 32.

Hexenal (U.S.S.R. brand of evipan sodium) has been used intramuscularly in 90 children aged 4 months to 13 years, for a wide variety of operations. Its advantages are: no mask interfering with field of operation; narcosis long enough for eye operations; enables emergency operations to be done without preparation of patient and without anesthetist; may be administered in the ward and spares the child the psychic trauma inflicted by sight of preparations in operating room; quick and pleasant induction of sleep; lasting postoperative sleep; retrograde amnesia; practically no contraindications; safety and ease of administration. The only difficulty so far encountered is the still incompletely worked out dosage.

A 10-percent solution is used, 5 to 6 c.c. is usually sufficient to initiate sleep in 3 to 5 minutes, and narcosis is usually complete in 10 to 15 minutes. If not, an additional 1 to 3 c.c. may be injected. The maximum dose required was found to be 13 c.c. and the maximum time for complete anesthesia 68 minutes. No vomiting during operation occurred, and after operation only when food was given too early. No salivation was observed, but some complaint of thirst afterward. One infant of two months had to be resuscitated from asphyxia, another held his breath long enough to require artificial respiration. Twitchings of muscles and spasms during operation indicate insufficient dosage. Instillation of a local anesthetic is desirable when conjunctival incision or fixation has to be used.

M. Davidson.

Swan, K. C. **Use of methyl cellulose in ophthalmology.** Arch. of Ophth., 1945, v. 33, May, pp. 378-380.

There has been in ophthalmology the need for a nonirritating and chemically inert colloid which would dissolve in water to produce a viscous, colorless solution having a high degree of transparency and a refractive index similar to that of the cornea. Such a solution would be useful as a bland vehicle for ophthalmic medicaments, as a substitute for natural secretions in cases of keratoconjunctivitis sicca, and as an emollient and cohesive solution to be used with contact lenses and goniioscopic prisms. Attempts have been made to adapt various compounds for these purposes, but with only partial

success. Most widely used have been acacia, tragacanth, and gelatin, but they are chemically unstable, have high refractive indexes, and are good mediums for the growth of bacteria and fungi. A synthetic substance, methyl cellulose, has considerable advantages over these naturally occurring gums. Its properties and some of its ophthalmic uses are reported. Directions for its use in each of these catagories are given. (References.)

R. W. Danielson.

3

PHYSIOLOGIC OPTICS, REFRACTION, AND COLOR VISION

Burian, H. M., and Ogle, K. N. **Meridional aniseikonia at oblique axes.** Arch. of Ophth., 1945, v. 33, April, pp. 293-310; also Trans. Sec. on Ophth. Amer. Med. Assoc., 1944, 94th mtg., p. 189.

The discomfort experienced by patients who require an astigmatic correction at oblique axes may be at least partially explained as due to induction, by the correcting lenses, of a meridional aniseikonia at an oblique axis. An aniseikonic correction at an oblique axis can be determined if, in addition to the usual measurements for image-size differences between the vertical and horizontal meridians, a measurement of the declination error introduced by the aniseikonic error at the oblique axis is also obtained.

Seventy-six patients were given prescriptions for aniseikonia at oblique axes on the basis of measurements on the space eikonometer. The data on 13 patients had to be discarded because of lack of information or because of unusual complicating factors. Of the remaining 63 patients, 36 were relieved of their symptoms, 16 were partially relieved, and 11 derived no benefit. A detailed tabulation of the data obtained is given, along with a more complete résumé of some cases. (3 figures, bibliography.)

John C. Long.

Lujinsky, G. F. **Correcting glasses in the breathing mask.** Viestnik Oft., 1942, v. 21, pt. 5, p. 43.

Several means of mechanically attaching temporary or permanent correcting lenses to gas-masks are described and illustrated.

M. Davidson.

Pokrovsky, A. A. **The question of visual correction in the breathing mask.** Viestnik Oft., 1942, v. 21, pt. 5, p. 46.

Two methods for mechanically attaching correcting glasses to gasmasks, utilizing flexible rubber frames, are described. (Illustrated.)

M. Davidson.

4

OCULAR MOVEMENTS

Adler, F. H. **Pathologic physiology of convergent strabismus.** Arch. of Ophth., 1945, v. 33, May, pp. 362-377.

This paper, delivered before the Chicago Ophthalmological Society on January 15, 1945, is the first Sanford Gifford Memorial Lecture. It consists of technical basic physiology which is difficult to abstract, but which should be read in full by anyone interested in the etiology of the nonaccommodational type of strabismus.

The author discusses proprioception from the ocular muscles, cortical centers for convergence, subcortical centers and pathways for convergence and divergence, and the vestibular apparatus. The literature and the author's own experiments are quoted to show the marked tendency toward, or in-

crease in, esophoria in anoxia and acute alcoholism.

In all cases of convergent squint, except those in which the condition is due to paralysis of an ocular muscle, and regardless of the degree of perfection of fusion, the important factor in the causation of squint is the force which produces it, and that is an excessive convergence innervation. (14 drawings, references.)

R. W. Danielson.

Berens, C., and Fonda, G. **Ocular sequelae of administration of general anesthesia.** Arch. of Ophth., 1945, v. 33, May, pp. 385-388.

A search of the literature revealed only one report of paralysis of the extraocular muscles associated with general anesthesia other than spinal anesthesia. There have been approximately 175 cases of paresis of the extraocular muscles related to the use of spinal anesthesia and one case in which such paresis was associated with local anesthesia administered for tonsillectomy.

In the case now described, paralysis of the right superior rectus muscle, pseudoptosis of the right upper eyelid, exophthalmos of the right eyeball, and fibrosis of the right inferior rectus muscle were diagnosed after administration of ethylene-ether anesthesia for an operation for pilonidal cyst.

The surgical technique by which these ocular abnormalities were handled is described. The most probable explanation of the mechanism by which the operation for pilonidal cyst with the patient under general anesthesia caused paralysis of the right superior rectus muscle, exophthalmos, and complete fibrosis of the inferior rectus muscle was that an embolism of the artery supplying the superior rectus muscle occurred. Fibrosis of the internal rectus muscle may have been caused by secondary contracture associated with embolic myositis. A specimen of the inferior rectus muscle was not obtained for biopsy because of extensive depression and fibrosis. Before operation it was thought that numerous adhesions existed between the muscle and the eyeball as the result of inflammation, but none was found.

The severe vertical strabismus was remedied by complete tenotomy of the inferior rectus muscle, resection of 8 mm. of the superior rectus muscle, transplantation of the lower half of the lateral rectus muscle to the temporal half of the stump of the inferior rectus muscle, and reattachment of the upper half of that stump. A useful field of binocular fixation resulted, indicating that the technique employed was reasonably sound physiologically. (4 figures, references.)

R. W. Danielson.

Dare, L. P. **Heredity as a factor in squint.** Amer. Jour. Ophth., 1945, v. 28, Aug., pp. 898-899.

Hardy, L. H., Chace, R. R., and Wheeler, M. C. **Ophthalmic prisms.** Arch. of Ophth., 1945, v. 33, May, pp. 381-384.

The work of Jackson, Prentice, and others in standardization of prisms is reviewed. Four methods of numbering prisms are available: the dimensions of the apex angle (a), expressed in degrees (°), the actual deviation, in degrees, produced by the prism when it is set at its position of minimal deviation, the centrad and the prism diopter.

In 1890 prisms were not commonly used to measure strabismus. Most

squints were estimated by the Hirschberg method, or the deviation was measured on the perimeter. The latter method is still the choice of most European and of many American ophthalmologists. Not until twenty years later, largely under the influence of Duane, was the prism-and-cover test popularized. This method is now widely taught and used, particularly in America.

No set of standards has been universally employed, and few, if any, manufacturers indicate in their markings the unit used. As a result prisms bearing the same label vary widely in their powers of refraction, and the owner of a set may be misled in interpreting results of his measurements.

In 1931 Hardy conducted measurements on eleven sets of prisms belonging to himself, his friends, and various ophthalmic clinics. The results showed wide variations. Last year further elaborations for measurements were set up and the data extended to include twenty sets of prisms, two of which were sets of plastic prisms. Measurements on these twenty sets is reported in detail and show that many of them have errors exceeding those of reasonable manufacturing standards. (2 figures, references.)

R. W. Danielson.

Wells, Louisa. **Orthoptic fictions and misconceptions.** Amer. Jour. Ophth., 1945, v. 28, Aug., pp. 890-895. (References.)

5

CONJUNCTIVA

Weber, F. P. **Sjögren's syndrome, especially its nonocular features.** Brit. Jour. Ophth., 1945, v. 29, June, pp. 299-312.

Chronic inflammatory changes in the parotid glands with recurrent exacerbations and similar changes in the other salivary glands and the lacrimal glands constitute Sjögren's syndrome. In its complete form it includes keratoconjunctivitis sicca, xerostomia, rhinitis sicca, pharyngitis sicca, and laryngitis siccå; but it occurs far more often in an incomplete form. Females are much more predisposed than males.

The literature is reviewed and ten cases are reported, all occurring in women, and mostly in the age groups beyond 40 years. Alopecia, keratitis, and reduced vision were associated with the parotid and salivary-gland changes and various other disturbances.

The author concludes that the manifold changes encountered can only be explained by some derangement of the vegetative nervous system, perhaps connected with structural or functional changes in the female sexual system. (References.) Edna M. Reynolds.

6

CORNEA AND SCLERA

Duncan, H. A. G. **Plastic corneal bath for application of penicillin.** Arch. of Ophth., 1945, v. 33, April, pp. 313-314.

A simple corneal bath of plastic (acrylic-acid derivative) has been modeled from an average-sized contact lens. The corneal curvature is made greater than that of an ordinary contact lens. A plastic tube is molded in place between the apex and the scleral gutter at an angle of 20 degrees with the anteroposterior axis. The tube is clamped to a device attached to the nose and forehead by adhesive. If a constant bath is desired a drip can be arranged from an ordinary set for continuous intravenous infusion. A

solution containing 1,000 units of penicillin per c.c. is used for this bath as well as for instillation. (2 illustrations, 1 reference.) John C. Long.

Hilding, A. C. **Comparative flaccidness and resilience of cornea and sclera.** Amer. Jour. Ophth., 1945, v. 28, Aug., pp. 900-902. (4 illustrations.)

Juler, F., and Young, M. Y. **The treatment of septic ulcer of the cornea by local applications of penicillin.** Brit. Jour. Ophth., 1945, v. 29, June, pp. 312-322.

Twenty-three cases of septic ulcer of the cornea treated with local applications of penicillin solution, 500 units to the c.c., are reported. The routine treatment consisted of hourly instillations of penicillin during the day and two-hourly instillations at night until the condition was under control. Atropine sulphate was used three or four times daily and the eyes were covered.

In a number of cases, with or without the previous application of decicaine, a few crystals of penicillin salt were applied to the surface of the ulcer. This caused no undue reaction of the tissues of the cornea or conjunctiva, but in some cases the subsequent pain was so severe as to necessitate morphine or a retrobulbar injection of 4 percent procaine. Impurity of the drug is suggested as the cause of the pain. Later, the practice of curetting beneath the overhanging edge of the ulcer before using the crystalline penicillin salt was adapted. Excellent results were obtained by these methods in 14 cases, good results in 5 cases, poor in 2 cases, and bad in 2 cases. Improvement was dramatic in a few cases of the less advanced type. Conjunctival discharge usually disappeared within 24 to 48 hours. Cases with secondary glaucoma showed more delay in healing than uncomplicated cases. In five of these cases, a Saemisch section was necessary to secure healing. The authors recommend that the Saemisch section be not delayed in cases in which improvement in unsatisfactory.

A note on the compatibility of penicillin with drugs used in ophthalmology is added. As tested in vitro, solutions of the following drugs do not interfere with the potency of penicillin: atropine sulphate, cocaine hydrochloride, homatropine hydrobromide, procaine, and decicaine. Fluorescein in higher concentrations inhibits penicillin to a small extent. Penicillin mixed with vaseline or adeps lanae retains its activity for 10 to 12 weeks in the refrigerator. At room temperature the vaseline ointment was active for seven weeks but the lanoline ointment was inactive. With a completely anhydrous base, penicillin fails to diffuse in vitro, but satisfactory results may be obtained by adding to the base 10 to 20 percent water. (3 figures, 1 table, references.) Edna M. Reynolds.

Maumenee, A. E., Hayes, G. S., and Hartman, T. L. **Isolation and identification of the causative agent in epidemic keratoconjunctivitis (superficial punctate keratitis) and herpetic keratoconjunctivitis.** Amer. Jour. Ophth., 1945, v. 28, Aug., pp. 823-839. (2 drawings, 4 charts, 2 photomicrographs, bibliography.)

Miller, R. B. **Corneal anesthesia in hysteria.** United States Naval Med., Bull., 1945, v. 44, April, pp. 749-751. (See Section 12, Visual tracts and centers.)

7

UVEAL TRACT, SYMPATHETIC DISEASE, AND AQUEOUS HUMOR

Boshoff, P. H., and Theron, J. J. **Heterochromia sympathica.** Arch. of Ophth., 1945, v. 33, April, pp. 311-312.

Four cases of heterochromia sympathica were observed in a series of 13,450 patients in South Africa. Two of the patients gave a history and presented scars of severe birth injuries. Both of these patients, in addition to showing differences in the color of the irises, had inequality in pupil size and in the width of the palpebral fissure. In one patient, the skin of the left side of the forehead and of the eyelids was continually wet with perspiration. The third patient showed abnormal flushing of the left side of the face. The left cornea was 0.5 mm. larger than that of the right eye, and the left pupil was larger. The iris of the left eye was brown, and that of the right eye was blue. In the fourth case, over a 14-year period, the color of the eyes had apparently changed from light gray to brown, and at the time of examination the right eye was blue and the left eye brown. The first three cases, at least, presented symptoms suggestive of a lesion of the sympathetic nervous system. (References.) John C. Long.

Fridman, S. J. **The pathogenesis of sympathetic ophthalmia.** Viestnik Oft., 1942, v. 21, pt. 5, p. 52.

Observation of serious cases of uveitis, accompanied by optic neuritis, vitreous opacification, and choroidal exudates—at times typically metastatic, following meningitis, at others with considerable papilledema, all responding well to repeated lumbar puncture, and all revealing a pathologic spinal fluid to begin with—suggested to the writer a new approach to the problem of the pathogenesis of sympathetic ophthalmia. There appeared in the literature occasional reports of meningitis complicating sympathetic ophthalmia, and in 1941 Tikhomirov (Viestnik Oftalmologii, v. 19, pts. 7-8) reported a rare case of neuroretinitis due to opticochiasmatic arachnoiditis and accompanied by sympathetic uveitis responding well to repeated lumbar punctures. Three cases of sympathetic ophthalmia were therefore studied and treated from this standpoint. One case had already had one eye enucleated and the other was atrophic, but the patient complained of severe headaches. Neurologic examination, including the spinal fluid, revealed a definite basal meningitic process which responded to appropriate treatment. The second case did not consent to lumbar puncture but clinically there was otherwise evidence of a disturbance of the central nervous system. After enucleation of the injured eye the sympathizing eye recovered. After enucleation of the offending eye, the third case again showed a frankly pathologic spinal fluid. When ophthalmoscopy became possible, there were indications of preceding optic-nerve involvement in the sympathizing eye as well as disseminated choroidal lesions. Treatment directed to the neurologic condition resulted in recovery of the eye. The three observations point toward the presence of a serous meningitis accompanying sympathetic ophthalmia, most likely around the chiasmal cistern, and permitting transmission of the process from one eye to the other. Lumbar puncture is therefore regarded as indicated in all eye injuries where

possibility of sympathetic ophthalmia exists, in order to favor as early a diagnosis as possible. Repeated lumbar puncture is also of therapeutic value.

M. Davidson.

Goldberg, H. D. **Gonorrheal choroiditis treated with penicillin.** Arch. of Ophth., 1945, v. 33, May, p. 406.

Although there have been numerous reports as to the efficacy of penicillin in treatment of external ocular conditions, none has indicated that inflammations of the posterior uveal tract are helped.

The author outlines in detail a case of choroiditis in which the result was particularly gratifying. Penicillin had been used in five other cases of choroiditis, in which the cause was probably tuberculous. There was no improvement in these cases, but in the one case, in which the etiologic agent seemed to be the gonococcus, the result was spectacular. This response can well be correlated with the specific reaction of other forms of gonococcic infection to penicillin. Penicillin should not be used in the treatment of choroiditis unless the lesion is presumed to be due to gonorrhea.

R. W. Danielson.

Irvine, S. R., Maury, F., Shultz, J., Thygeson, P., and Unsworth, A. **The treatment of nonspecific uveitis with penicillin.** Amer. Jour. Ophth., 1945, v. 28, Aug., pp. 852-855. (2 tables, references.)

Loewenstein, A., and Foster, J. **Iridoschisis with multiple rupture of stromal threads.** Brit. Jour. Ophth., 1945, v. 29, June, pp. 277-282.

The author suggests the name of "iridoschisis" for a clinical condition in which there is division of the iris stroma into two layers, the anterior of which floats in the aqueous. Some of the anterior stromal fibers rupture and their distal ends float freely in the anterior chamber. Eight cases previously reported in the literature are reviewed and an additional case is reported.

The authors' patient, a woman aged 75 years, had had bilateral iritis in 1924 followed by bilateral iridectomy for glaucoma in 1928. It was not possible to determine whether or not the so-called iritis was an early glaucoma. When examined in 1940, because of failing vision and recurrent ocular pain, a curious change in the lower part of the iris of each eye was seen, resembling plants floating in a pool. The patient was not seen again until 1944, when she developed intense pain and complete blindness in the left eye, due to absolute glaucoma.

Histologic examination of the left eye showed general atrophy of the iris with the anterior layer preserved on either side of the iris coloboma above, but represented elsewhere by thin, floating membranes resembling fine lace. Physiologic fatty changes of senile origin were found in the periphery of the cornea, the sclera, the ciliary body, and Bruch's membrane. The atrophic iris tissue was free from fat. Several free threads, completely separated from other iris tissue, were seen in the sections. Each of these contained a blood vessel with well-preserved, thick, glassy endothelium, whose lumen was filled with red blood corpuscles. The dilator was well preserved and at one point hypertrophied. The sphincter fibers were normal. The posterior part of the eye revealed no pathologic changes.

It is suggested that the mechanism of these changes is exaggeration of a

physiologic aging process of the iris, in which the middle layers became atrophic. Subsequently, the anterior and posterior layers of the iris are separated and finally the threads of the anterior layer which remain, and which contain a blood vessel, rupture and float freely at one end. The basic change is senile but the process may be aggravated by proteolytic enzymes in the aqueous, the product of glaucomatous metabolism. (7 illustrations, references.) Edna M. Reynolds.

Loewenstein, A., and Garrow, A. **Thrombosis of the retinal, choroidal, and optic-nerve vessels.** Amer. Jour. Ophth., 1945, v. 28, Aug., pp. 840-851. (15 photomicrographs, references.)

Rosen, Emanuel. **Uveitis, with poliosis, vitiligo, alopecia, and dysacousia** (Vogt-Koyanagi syndrome). Arch. of Ophth., 1945, v. 33, April, pp. 281-292.

A case of Vogt-Koyanagi syndrome in a 24-year-old Puerto Rican is reported in very considerable detail. The first of four attacks of uveitis occurred five years before the present observations. Among the distinctive ocular characteristics observed in this case were: (1) depigmentation of the fundus, producing a red reflex seen from almost any angle when a beam of light struck the eye; (2) keratic precipitates, for the most part in the midcorneal zone, closely crowded together; (3) small, fluffy "Koeppe nodules"; (4) atrophy of the inner circle of the iris, present in each eye; (5) white oval atropic patches in the periphery of the retina of each eye; (6) deep anterior chambers (reported previously by several authors); (7) the nerve head elongated ovally, and, because of several areas of depigmentation just adjacent to it, producing an almost oblong effect; (8) the macula presenting a peculiar heaped-up arrangement of pigment; (9) decomposition of the vitreous framework, with the presence of minute brownish granules.

There were some patches of white hair on the occiput and some small white eyelashes in each lid. Vitiligo was seen on the shoulders and chest. Treatment consisted in desensitization to horse serum. The patient's condition gradually improved so that vision of 20/20 was obtained in one eye and 20/25 in the other.

The author tabulates 47 cases of this syndrome previously noted in the literature. Horse serum is suggested as a form of therapy. The relationship between this syndrome and other diseases is pointed out, and an explanation of the nature of the syndrome is suggested. (3 illustrations, 2 tables, references.) John C. Long.

Sampson, R. **Periarteritis nodosa affecting the eye.** Brit. Jour. Ophth., 1945, v. 29, June, pp. 282-288. (See Section 10, Retina and vitreous.)

Spaeth, E. B. **Iridocyclitis (uveitis), complicating cataract and retinal separation: their interrelationship.** Trans. Amer. Acad. Ophth. and Otolaryng., 1945, 49th mtg., May-June, pp. 265-274.

Thirty-five consecutive cases of this complex are surveyed, being considered as parts of an inflammatory or degenerative syndrome. Class 1 includes 17 cases of uveitis, cataract, and retinal separation and subsequent cataract; class 2, 7 cases of the sequence of retinal separation and then uveitis, or the two occurring simultaneously with complicating cataract; class 3, 11 cases of complicated cataract

occurring first, presupposing preexistence of a uveitis, or occurring with reactivation of an old uveitis postoperatively, and terminating with retinal separation.

Retinal separation is basically not caused by myopia but by a primary choroiditis and retinal atrophy. Retinal detachment and probably obliteration of peripheral vessels occur during the uveitis. The causative factors found were: (1) a bacterial endogenous infection, especially from teeth, tonsils, and prostate; (2) tuberculous infection. Preoperative hospitalization for approximately two weeks is advised so that foci of infection and other etiologic factors may be reduced to a minimum, and also so that retinal tears may be given the best chance to return as near the choroid as possible.

An appeal is made for early and accurate diagnosis of uveitis, with prompt reduction or elimination of causative factors. Treatment with foreign protein is preferred. (2 illustrations, references.) Charles A. Bahn.

8

GLAUCOMA AND OCULAR TENSION

Boshoff, P. H. **Use of Troncoso's magnesium implant in cyclodialysis for relief of glaucoma.** Arch. of Ophth., 1945, v. 33, May, pp. 404-405.

Implantation of a strip of magnesium along the spatula tract in cyclodialysis is a modification suggested by Uribe Troncoso (Amer. Jour. Ophth., 1940, v. 23, p. 835). The author reports two cases in which moderately severe reactions took place. In both cases the exact technique as described by Troncoso was followed, except that a single 6 by 1.5 mm., strip of magnesium was employed. The author is of the opinion that a single strip of magnesium measuring 5 to 6 by 1 mm. is the maximum size to be used, because of the tendency to excessive formation of gas. If this does occur, the gas may be allowed to escape by inserting a thin hollow needle through the cornea. (2 figures, references.) R. W. Danielson.

Grossman, E. E. **Glaucoma associated with nevus flammeus.** Arch. of Ophth., 1945, v. 33, May, pp. 389-391.

The occurrence of glaucoma with nevus flammeus is rather rare in both the foreign and the American literature. In the present case, although deep glaucomatous cupping was present, no evidence of increased intraocular pressure was noted. The number of cases on record in which there was no evidence of increased intraocular pressure, or of instability of the pressure-regulating mechanism, but in which there was excavation of the disc of a glaucomatous character, is sufficient to warrant the assumption that the cupping is not always due to glaucoma; but the condition should be called pseudoglaucoma.

Although there was no typical increase in intraocular pressure in the present case, the author suggests that glaucomatous cupping may have resulted from a congenitally weakened lamina cribrosa, on which a tension of 19 or 23 mm. of mercury produced as pathologic an effect as would a tension of 40 or 50 mm. of mercury in the usual eye. (References.)

R. W. Danielson.

Guyton, J. S. **Choice of operation for primary glaucoma with cataract.** Arch. of Ophth., 1945, v. 33, April, pp. 265-268. (See Amer. Jour. Ophth., 1945, v. 28, Sept., p. 1046.)

Hess, Leo. **Pathogenesis of glau-**

coma. Arch. of Ophth., 1945, v. 33, May, pp. 392-396.

The author reviews his own previous publications. He argues that glaucoma does not arise primarily in the eyeball, but has its origin in certain nerve structures outside the eye. He considers the actual site of the crisis in acute glaucoma to be the ciliary ganglion and the nerves and capillaries of the ciliary body. According to his concept, the eyeball, certain peripheral nerves, the ciliary ganglion, and the diencephalic center form a unit concerned with the vital function of regulation of intraocular pressure, and finally governed, as are the functions of all the visceral organs, by the cortex. (References.) R. W. Danielson.

Meyer, S. J., and Sternberg, P. **Surgical management of glaucoma in correlation with gonioscopy and biomicroscopy.** Arch. of Ophth., 1945, v. 33, May, pp. 358-361. (See Amer. Jour. Ophth., 1945, v. 28, July, p. 786.)

9

CRYSTALLINE LENS

Guyton, J. S. **Choice of operation for primary glaucoma with cataract.** Arch. of Ophth., 1945, v. 33, April, pp. 265-268. (See Amer. Jour. Ophth., 1945, v. 28, Sept., p. 1046.)

Hilding, A. C. **Experimental and clinical studies on certain safety factors in closure of cataract incisions.** Amer. Jour. Ophth., 1945, v. 28, Aug., pp. 871-885. (14 figures, 1 table, references.)

Lutman, F. C., and Neel, J. V. **Inherited cataract in the B. genealogy.** Arch. of Ophth., 1945, v. 33, May, pp. 341-357.

The numerous publications on developmental cataract have tended to show uniformity in the type of cataract observed within any family line. Nevertheless, it is sometimes found that certain cataractous persons in a given pedigree have a type of opacity of the lens significantly different from that presented by the remaining affected members of the family. This fact has been commented on by various observers, and from time to time a question has been raised as to the etiologic relationships of the various types. The present paper describes a genealogy of 123 people, 44 with cataract, which genealogy is remarkable for the variety of forms the cataract assumes. The genealogy extends over five generations. Thirty-four of these 123 persons were examined by the authors, and 21 of these had cataract.

The persons composing the genealogy are the descendants of one William B., who at the age of 24 years migrated from England to New York. The majority of the family have remained in rural districts and have been laborers, farmers, and unskilled workmen. No one in the family either with or without cataract has achieved unusual prominence or success in any field of work; nor were any persons encountered of the economically dependent and shiftless type. Evidences of physical, moral, or mental degeneracy in the family were absent.

Most of those with cataract whom the authors saw had had only one eye treated surgically, and with this eye possessed approximately normal corrected vision. In a majority of the cases the surgical treatment up to about the age of 30 years had been repeated discissions. The cataract was unaccompanied by any other structural abnormalities of the eye.

Three distinct types of cataract can

be recognized among the affected persons, as follows: (a) fenestrated opaque flakes, predominantly in the axial region of the anterior adult nucleus, (b) a fetal nuclear opacity containing either flakes or spherical bodies, and (c) opaque lens fibers, most prominent adjacent to the adult lens sutures. The third type was seen in only a single person.

Three hypotheses for the occurrence of distinct types of cataract within a single pedigree are advanced, namely: (a) the existence of genetic and environmental modifiers which bring about variations in the expression of a "main" factor, (b) the simultaneous presence in the founder of the line of two different, independently inherited factors responsible for cataract, and (c) the occurrence of mutation. The first theory is favored. (13 figures, references.) R. W. Danielson.

10

RETINA AND VITREOUS

Dimitry, T. J., and Lombardo, R. T. **The lipotropic effect of choline in retinal tuberculosis.** Amer. Jour. Ophth., 1945, v. 28, Aug., pp. 902-903. (References.)

Kaminskaya, Z. **Diagnostic importance of certain alteration of the ocular fundus with subarachnoid hemorrhages.** Viestnik Oft., 1942, v. 21, pt. 5, p. 13.

In the early stages the diagnosis of subarachnoid hemorrhage is readily made on the basis of sudden onset, meningitis syndrome, and bloody spinal fluid. Later, when only headaches remain, the fundus picture may help in making a retrospective diagnosis. Fundus sequelae have been observed in four cases of head contusion with loss of consciousness and transient loss of vision in one eye. The fundus lesions were all similar and consisted in prepapillary and parapapillary connective-tissue membranes, suggestive of retinitis proliferans lesions but differing in that no other fundus pathology was found and the source of hemorrhage was therefore presumed to be extraocular, the result of seepage of subarachnoid blood into the vitreous via the cribriform plate. (Illustrated.) M. Davidson.

Loewenstein, A., and Garrow, A. **Thrombosis of the retinal, choroidal, and optic-nerve vessels.** Amer. Jour. Ophth., 1945, v. 28, Aug., pp. 840-851. (15 photomicrographs, references.)

Pollak, H. **Observations on the effect of riboflavin on the oral lesion and dysphagia, and of riboflavin and brewer's yeast on dark adaptation, in a case of so-called Plummer-Vinson syndrome.** Brit. Jour. Ophth., 1945, v. 29, June, pp. 288-299.

Seventeen years earlier the patient, a male aged 39 years, had had gastroenterostomy for duodenal ulcer. For four years prior to hospital admission, he had had soreness of the tongue, cracks at the corners of the mouth, difficulty in swallowing, and such soreness of the mouth that he could hardly eat. The tongue was smooth and magenta-colored, the red-cell count 3.94 million, Hb. 38 percent. Gastric secretion showed no free HCl after histamine, and gastroscopy showed marked atrophy of the mucosa. Under daily injections of 5 mg. of riboflavin for five days, and further treatment with fersolate, brewer's yeast, and ascorbic acid, the various conditions improved.

When seen again six months later,

the patient was well except for recurrence of the soreness at the corners of the mouth and slight dysphagia. He complained at this time of burning sensations in the eyes and poor vision in the dark. Visual acuity, fundi, and fields were all normal. Slitlamp examination revealed a considerable increase in the vascularization of the limbus. Dark adaptation was found to be markedly impaired.

Serial tests of dark adaptation were made over a period of eight months. When the performance had remained stationary for two months without treatment, a slight but significant improvement was recorded during treatment with riboflavin. After his adaptation had been allowed to fall back to the original level, the patient was treated with 20 gm. of brewer's yeast daily for four months. During this period, dark adaptation gradually returned to normal.

Impairment in dark adaptation apparently reflects a disturbance in general metabolism, reversible by dietary factors of the vitamin-B complex. (3 graphs, references.)

Edna M. Reynolds.

Sampson, R. **Periarteritis nodosa affecting the eye.** Brit. Jour. Ophth., 1945, v. 29, pp. 282-288.

A case of periarteritis nodosa is described in which the choroidal, retinal, and ciliary arteries were affected. Ophthalmic examination was made several times during the four weeks preceding the patient's death. There was a concomitant divergent strabismus of 15 degrees and convergence was absent. In the right eye, the retinal vessels were of normal caliber, but there was generalized retinal edema and the disc margins were blurred. There were several small areas of retinal detachment, and deep to the retina in these areas were grayish-white nodules of oval or branching shape, resembling miliary tubercles of the choroid. The left eye showed a large, globular retinal detachment far out on the temporal side. It had all the appearances of an exudative detachment and there was no hole or tear. The areas of detachment in the right eye later became confluent and several new patches of choroidal exudate appeared in both eyes. A week after the first examination the right detachment had diminished and the left detachment had disappeared.

A week before death, the fundi were normal except that there were small lightly pigmented scars at the sites of the choroidal lesions previously noted. No sign of albuminuric retinopathy appeared.

The eyes and the orbital contents were obtained for examination. No definite pathologic changes were found in the orbital structures. The anterior halves of the globes showed irregular elevations of the retina produced by subretinal exudate as far forward as the ora serrata. In the upper temporal quadrant of the left eye a melanoma of the choroid was discovered, of low-grade malignancy.

Microscopic examination showed destruction of the neuroepithelium, probably due to post-mortem changes. In the nerve fiber and ganglion-cell layers, there were many vacuoles. There was definite papilledema of the right disc. Some of the retinal vessels showed thickening of their walls. The optic-nerve sheath of the right eye was distended and there was a hemorrhage in front of the lamina cribrosa. A thrombus was seen in the central vein. Many of the choroidal vessels had thickened walls and some of them had

a hyaline character. One cicatricial nodule occupied the whole thickness of the choroid, apparently because of thrombosis of one of the large vessels.

The main interest of the case lies in the finding of healed arteritis in many of the choroidal vessels. Similar appearances were found in the retinal vessels of the right disc and in some of the extrascleral vessels. (5 illustrations, references.)

Edna M. Reynolds.

Spaeth, E. B. **Iridocyclitis (uveitis), complicating cataract and retinal separation: their interrelationship.** Trans. Amer. Acad. Ophth. and Otolaryng., 1945, 49th mtg., May-June, pp. 265-274. (See Section 7, Uveal tract, sympathetic disease, and aqueous humor.)

11

OPTIC NERVE AND TOXIC AMBLYOPIAS

Loewenstein, A., and Garrow, A. **Thrombosis of the retinal, choroidal, and optic-nerve vessels.** Amer. Jour. Ophth., 1945, v. 28, Aug., pp. 840-851. (15 photomicrographs, references.)

Popov, M. Z. **The mechanism of secondary deformity of the optic nerve in war injuries of the orbit.** Viestnik Oft., 1942, v. 21, pt. 5, p. 3.

Isolated injuries of the orbit and optic nerve are very uncommon in this war. Of the 13 cases observed, resulting from injury to the outer orbital wall or the zygomatic arch, 11 cases resulted in injury to the optic nerve of the same side, and two cases presented a picture of injury of the optic chiasm. In five cases there was optic atrophy. The earliest observation of atrophy was 14 days after the injury. Eight eyes presented hyperemia of the nervehead. In two opticochiasmatic cases the right eyes suffered contusions, while the left eyes presented lesions of the nervehead. X-ray studies done on only four cases showed fissures of the optic foramina in three and a foreign body in the orbit in the fourth case. The hyperemia is explained as a reactive hyperemia in the presence of injury to the orbital wall and the atrophy as the result of pressure on the nerve fibers from the exudation accompanying the hyperemia.

M. Davidson.

12

VISUAL TRACTS AND CENTERS

Givner, Isadore. **Ophthalmologic features of intracranial chordoma and allied tumors of the clivus.** Arch. of Ophth., 1945, v. 33, May, pp. 397-403.

Intracranial chordoma and allied tumors of the clivus are of significance to the ophthalmologist, who may be the first to see the patient, since diplopia and visual disturbances occur in over a third of the cases and may, together with headache, be the only symptoms.

A chordoma is a neoplasm arising from embryonic rests of the chorda dorsalis, a specific embryonal tissue about which the spinal column develops. As the base of the skull is molded, the posterior end of the cranial part of the chorda is forced backward and dorsally so that it lies on the occipital plate in the dorsal groove anterior to the foramen magnum. This embryonal tissue persists in infants in the centers of the intervertebral discs and in the coccyx, as well as at the base of the skull.

In this paper attention is directed only to spheno-occipital tumors. Less than one hundred cases of such chordoma have been reported. The benign

form is of no clinical importance. The so-called malignant form is a slow, expansile growth, traversed by fibrous septums, between which is a sparsely cellular tissue composed largely of an intracellular matrix of gelatinous or mucinous character. The early structure resembles hyaline cartilage but is without intercellular substance. The cells are round, large, vacuolated, and hyperchromatic, and may resemble epithelium. The majority of the tumors first cause symptoms in the third or fourth decade of life—the average age being 36 years.

The four most common symptoms of tumors of the clivus are headache, visual disturbance, nasal obstruction (from ventral extension of the tumor in the direction of the nasopharynx) and nuchal pain. The headaches are of increasing severity, with temporary periods of relief, and are referred to the frontal or the occipital region. Visual disturbances are the result of compression of the optic chiasm or of the sixth nerve.

In the differential diagnosis the following possibilities should be considered: tumor of the fourth ventricle, meningioma of the cerebellopontile angle, infiltration tumor of the pons (glioma), and vascular lesions of the pons. Two cases are reported. (6 figures, references.) R. W. Danielson.

Miller, R. B. **Corneal anesthesia in hysteria.** United States Naval Med. Bull., 1945, v. 44, April, pp. 749-751.

Among 600 men examined in an induction station 19 were found to be affected by hysteria, including 17 literate and illiterate inductees who showed bilateral corneal anesthesia. Corneal anesthesia was found, however, in a man otherwise showing no nervous symptoms, and in a group of men whose general conditions had been diagnosed as due to hysteria but not recorded as showing corneal anesthesia. The author concludes that bilateral corneal anesthesia must be considered an important and virtually pathognomonic sign of the psychoneurosis. M. Lombardo.

13

EYEBALL AND ORBIT

Krol, A. G. **Is it necessary for the oculist to do urgent enucleation at the fighting front?** Viestnik Oft., 1942, v. 21, pt. 5, p. 27.

Postponement of enucleation for crushing injuries of the globe, waiting 7 to 12 days, is recommended in the presence of ecchymosis of lids and conjunctivas. M. Davidson.

Medviedev, N. I. **The technique of formation of mobile stump after enucleation.** Viestnik Oft., 1942, v. 21, pt. 5, p. 13.

Best possible cosmetic result after enucleation is particularly important in view of the youth of the war injured. The author implants the scleral capsule of the enucleated eye. At first the whole capsule was used, but it was found to give rise to severe postoperative edema. A considerable portion of the attached optic nerve was also used at first, but it was abandoned for the same reason. Now the author sections the globe at the equator, and removes the nerve entirely to leave an open scleral canal. Four incisions are made in the sides of the sclera, 4 mm. from the nerve, for the reception of the internal and inferior recti, 5 mm. from it for the superior rectus, and 6 mm. from it for the external rectus. Thus prepared the sclera is placed on a finger tip, inserted, and turned so that the

nerve canal faces forward. The four tendons are carefully spread out, and the ends sutured to the central lips of the incisions. The conjunctiva is sutured on top loosely, so as to leave the nerve canal open for drainage. The results are a compact mobile stump and a cosmetically excellent prothesis. Homotransplants and scleras from cadaver eyes may also be employed. (Illustrated.) M. Davidson.

14

EYELIDS AND LACRIMAL APPARATUS

Berke, R. N. **Resection of the levator palpebrae muscle for ptosis.** Arch. of Ophth., 1945, v. 33, April, pp. 269-280; also Trans. Amer. Ophth. Soc., 1944, v. 42, p. 411.

Resection of the levator muscle is the operation of choice for correction of ptosis when the muscle is not completely paralyzed. The author has made elaborate studies on cadaver material to demonstrate the anatomy and the effects of resection of the muscle. Special attention has been devoted to the Bowman-Wheeler operation and the Blaskovics technique. Apparently Mueller's muscle and the tendon of the levator muscle are always excised together in routine resection of the levator muscle as reached through conjunctiva. When resection of the levator muscle fails to correct the ptosis adequately, the fault may be due to resection of Mueller's muscle instead of the tendon of the levator muscle. Inadequate correction after resection of the levator muscle may be due to insufficient resection, pulling out of the suture, or absence of the levator muscle. (6 photographs from cadaver specimens, references.)

John C. Long.

Hague, E. B. **Surgical reconstruction of the upper lid.** Amer. Jour. Ophth., 1945, v. 28, Aug., pp. 886-889. (3 figures, references.)

Margolin, E. J. **Sulfidine in the therapy of dacryocystitis.** Viestnik Oft., 1942, v. 21, pt. 5, p. 49.

In the conservative handling of lacrimal-sac disease, even in the presence of corneal ulcers, daily washings with the following solution: sulfidine and sodium bicarbonate aa. 0.8, with 96 percent alcohol 20, and distilled water 80, has proved successful in 17 cases. M. Davidson.

Medviedev, N. I. **Plastic correction of cicatricial shortening of the upper eyelid.** Viestnik Oft., 1942, v. 21, pt. 5, p. 11.

In four cases of cicatricial contraction of the upper lid from burns, good cosmetic results were achieved by transplantation of skin from the other upper lid. The method is limited to transplants 4 to 6 mm. in width. Otherwise there would be shortening of the donor lid. M. Davidson.

Tikhomirov, P. E. **Methods of treatment of epiphora.** Viestnik Oft., 1942, v. 21, pt. 4, p. 30.

Complete splitting of the canaliculus for stenosis of the punctum is contraindicated in view of evidence of the active role of the canaliculus in conduction of tears. Graves's operation, found successful in nine cases, is recommended. Mild eversion of the punctum can also be corrected by Graves's operation. Its use in more serious cases has resulted in relapses. In serious cases the author excises a strip of conjunctiva 20 to 25 mm. long by 2 to 2.5 mm. wide, 1 to 1.5 mm. from the lid border, and ending in a rhombus at the

inner end. The sharp angles of the latter are placed vertically. This operation has proved successful in 46 out of 56 eyes. Any persistent mild eversion can readily be corrected by Graves's operation. Strictures of the canaliculus are treated by introduction of a discission needle and cutting through the stricture. A retention sound is then introduced, and is removed daily for five to eight days, washing out the passages before replacement. Study of 43 cases treated by the use of sounds for a presumed stenosis of the lacrimonasal duct showed true stenosis only in six cases. The author regards the use of sounds as giving rise to strictures and therefore not to be recommended. In lieu of extirpation of the lacrimal gland, when indicated, electrocoagulation has been found effective in 47 eyes. (Illustrated.)

M. Davidson.

Weber, F. P. **Sjögren's syndrome, especially its nonocular features.** Brit. Jour. Ophth., 1945, v. 29, June, pp. 299-312. (See Section 5, Conjunctiva.)

16

INJURIES

Awerbach, M. I. **Injuries of the orbit and adjacent parts.** Viestnik Oft., 1942, v. 21, pt. 4, p. 3.

The incidence of injuries affecting the eye rose from 0.86 percent in the Franco-Prussian War to 10 percent in the First World War, and to 17 percent in the Spanish Civil War. In the present war injuries are mainly the result of mine explosions and are characterized by simultaneous injuries to head and extremities. The general surgeon, less familiar than the ophthalmologist with the anatomy of this region in handling these injuries, should bear in mind that an incised wound apparently the result of the impact of a sharp object from without may be caused by a blunt object striking against the sharp edges of the upper or lower orbital margin. Otherwise he will overlook serious craniocerebral injury requiring attention. He should be on the alert for crepitation from injury of the sinuses which may not show up in the Xray; for injuries to the pulley of the superior oblique muscles; for other muscle injuries and nerve injuries; and for traumatic enophthalmos due to escape of orbital contents through the fragile lamina papyracea. Reference is made to a rare case in which the globe disappeared entirely into the ethmoid, with the appearance of traumatic anophthalmos, but with light perception via the nose reported by the patient. The general surgeon is also warned against too generous débridement of wounds and postponement or crude suturing of lid injuries so as to create serious deformities requiring plastic surgery later. Among measures to combat infection, Vishnevsky's ointment (oleum ricini, 100; xeroform and oleum cadini or oleum fagi, aa 3.0) has given good results.

M. Davidson.

Baltin, M. M. **Roentgen diagnosis and localization of wartime intraocular foreign bodies.** Viestnik Oft., 1942, v. 21, pt. 4, p. 19.

During this war there are frequently foreign bodies both in the lids and in the globe. To facilitate X-ray localization, aluminum elevators are used to lift up or pull down the lids during the exposure. In the Baltin modification of the Comberg method of localization, use is made of an aluminum prothesis in the shape of a segment of a sphere of from 12 to 15 mm. radius, and pro-

vided with a central hole of 11 mm. in diameter, and 0.5-mm. lead guides soldered in four perforations at 90-degree intervals, 0.5 mm. from the central perforation. When there is contraindication to introduction of the film into the conjunctival sac to secure a bonefree X ray, Baltin recommends rotation of the head 40 to 45 degrees and taking an ordinary side view. (Illustrated.) M. Davidson.

Diachkov, S. A. **Craniocerebral lesions through the orbit.** Viestnik Oft., 1942, v. 21, pt. 4, p. 16.

Multiplicity of injuries resulting from fragments, in particular those due to mine explosions, characterizes this war. The eye injuries themselves are also likely to be multiple. Craniocerebral injuries via the orbit may escape the notice of both ophthalmologist and neurosurgeon in the absence of careful X rays. After injury apparently to the eye only, and enucleation of the eye, evidence of craniocerebral injury may appear two to four days later, and may result either in a brain abscess or a diffuse meningitis. The previous methods of handling such cases have had to be revised. The writer observed eight such cases in 1941. The first four died under conservative treatment recommended by neurosurgeons, who were guided by general principles of treatment of open-skull injuries. The deaths were either from diffuse meningitis or from brain abscess. The subsequent four cases were handled by exenteration of the orbit with conservation of the periosteum, débridement of the orbital wound, removal of fragments, and isolation of sinuses from the cranial cavity. One case had a brain prolapse, three other cases had ethmoidal involvement. All four recovered. Since then a fifth case, diagnosed only 2½ months after enucleation of an eye with retention of a shell fragment lodged partly in the middle fossa and partly in the orbit near its apex, was successfully operated upon with recovery. In such cases, therefore, the only effective method is exenteration of the orbit.

M. Davidson.

Krol, A. G. **The inexpediency of evisceration in war injuries to the eye.** Viestnik Oft., 1942, v. 21, pt. 5, p. 28.

With the diagnosis of panophthalmitis, eviscerations are done more precipitately in war injuries than in times of peace. At operation on four such cases of pseudopanophthalmitis following crushing injuries of the globe, the error was discovered and the ever-present fear of sympathetic ophthalmia following evisceration was eliminated. It is therefore recommended that first the necrotic cornea be excised, and that, when there is no evidence of panophthalmitis on further inspection, enucleation be proceeded with, after suturing the opening in the globe. Because of adhesions of muscles to the globe in such cases, tenotomy hooks are of little use. M. Davidson.

Shilin, J. V. **Restoration of the cavity of the conjunctival sac by means of electrocoagulation.** Viestnik Oft., 1942, v. 21, pt. 5, p. 22.

In this war one third of all eye injuries are perforating injuries, and in 40 to 50 percent of the latter enucleation is required. Cicatricial bands in the sockets often prevent wearing a prothesis. Electrocoagulation has been found very effective for elimination of these bands. But a fine sewing needle has been found superior to any cutting electrode. Only in cases of widespread general contraction of the socket have

relapses occurred. The prothesis is put in immediately. The method has been found useful in dealing with symblepharon. M. Davidson.

Strakov, V. P. **The surgeon's conduct as to war injuries to the visual organ.** Viestnik Oft., 1942, v. 21, pt. 4, p. 12.

In the present war the visual apparatus has been subject to many and complicated injuries. Immediate attention at the front has to be provided by general surgeons as well as by ophthalmologists. Suturing of lid wounds must be done as early as possible, and may be done within one or two weeks with excellent results. However, in the presence of deeper wounds communicating with the sinuses, early suturing should be avoided. Suturing of lacerations of the lower fornix should begin from below, and the suture line should be made to run upward and inward in order to prevent epiphora. Plastic repair has been found practicable within from two to six months after injury. In doing this, care should be taken to free underlying muscle from scar tissue, so that the muscle may function well afterward. Conjunctival flaps are not considered advantageous in corneal injuries. If the corneal wound is already healed they are not necessary. Infection rarely follows either excision or replacement of a prolapsed iris. Cases of infections under the flap have been observed. The flap often slides back. It sometimes remains adherent so that later excision and perhaps iridectomy becomes necessary. The flap may interfere with X rays and ophthalmoscopy in the presence of a complicating foreign body.

Intraocular foreign bodies have been frequent in this war. When lodged in the cornea spontaneous extrusion has been frequently observed. Lead particles have been observed as lustrous globules and are well tolerated. Magnetic particles deep in the cornea can be removed more readily by incision and magnet than by keratotomy and spatula. A conjunctival suture is indicated for small scleral wounds but not for large ones. Immediate enucleation of eyes, previously regarded as tending to prevent sympathetic ophthalmia, should be discouraged. The 10 to 14 days incubation period of sympathetic ophthalmia gives ample time for judgment as to its necessity. An eye apparently blind from orbital hemorrhage may entirely recover. When removal is indicated in the presence of infection, evisceration is less dangerous. More magnet extractions are performed in this war than in previous wars. Cuts over the ciliary body have also been more numerous. Frequently, therefore, later enucleation for iridocyclitis has been done at base hospitals. It is therefore recommended that case histories be kept together in one institution, and preferably in the institution where treatment took place.

M. Davidson.

Sverdlov, D. G. **Early prothetization of the conjunctival cavity by special prothesis dilators as a prophylactic measure against posterior contractions.** Viestnik Oft., 1942, v. 21, pt. 5, p. 31.

Normally, after enucleation or evisceration, an artificial eye can be worn with comfort in 14 to 16 days. But often, because of pain and discharge, the artificial eye is not worn for several months. By the end of that time the socket is found too much contracted for the prothesis. The discharge moreover is often simply the result of not wearing the prothesis. To prevent contraction, special socket dilators of vari-

ous sizes are employed. They are flatter than the ordinary artificial eye and have a hole in the center which permits inspection of socket and its irrigation, avoiding removal for cleansing for five or six days at a time. They are put in at times immediately after operation, generally within two days, and are worn until the permanent prothesis is tolerated. Good results are usually achieved in eight days. In only five out of thirty cases were they ineffective, because of extraordinary inflammation and scar formation following burns in two, and crushing injuries in three. (Illustrated.) M. Davidson.

Tikhomirov, P. E. **Indications and techniques of the magnet test for intraocular war splinters.** Viestnik Oft., 1942, v. 21, pt. 5, p. 17.

While in industrial accidents intraocular foreign bodies are magnetic in 93.5 percent and the magnet test unnecessary, in war injuries the particles may be nonmagnetic in a considerable proportion of the cases. They are also commonly multiple. In the war with Finland 35 percent of the intraocular foreign bodies were nonmagnetic, so that in 93 percent the magnet test had to be resorted to. The anamnesis, helpful in industrial accidents, is not available in the case of enemy bullets and shrapnel. The magnet test should not be applied blindly, that is to say, should not be guided merely by the sensation of pain as if this were its purpose. When the foreign body is in the anterior chamber, iris, or lens, the purpose of the test is principally to magnetize an otherwise weakly magnetic body and dislodge it. It may therefore be repeated with increasing strength. When the foreign body is in the ciliary body, use of the magnet must be preceded by careful X-ray localization. Since pain may be elicited, the current must be very weak to start with. When the foreign body is in the vitreous and visible ophthalmoscopically, the magnet test must be done under ophthalmoscopic control. M. Davidson.

17

SYSTEMIC DISEASES AND PARASITES

Abreu Fialho, Sylvio de. **Ocular manifestations of brucellosis.** Rev. Brasileira de Oft., 1945, v. 3, June, pp. 189-200.

The author first summarizes the statistics presented by Weskamp, Maffrand and Peirotti (Arch. de Oft. de Buenos Aires, 1943, v. 18, Dec., p. 666.) concerning the incidence of involvement of various ocular tissues. He then reports a personal experience in a white Brazilian of 25 years, who worked as cattleman on a municipal estate. Two months previously the right eye had become inflamed, with some loss of vision. This had cleared up, but at the time of the consultation the left eye was going through the same experience. The vision of this eye was reduced to 2/10, and the symptoms included moderate lacrimation, discrete photophobia, deposits on Descemet's membrane, and threads in the vitreous. There was a record of frequent abortion among the cows on the farm, and the patient habitually drank raw milk. Other examinations were negative, except that there was a good deal of dental caries. The author made only a presumptive diagnosis of ocular brucellosis, since it was impossible to hold the patient for laboratory tests. A number of other references from the literature are reviewed.

W. H. Crisp.

Hansel, F. K. **Allergy in relation to**

otolaryngology and ophthalmology. Laryngoscope, 1944, v. 54, May, pp. 238-252.

A review of the literature of the previous year regarding allergy as related to otolaryngology and ophthalmology is reviewed. In 41 cases which showed edema of the lids the etiologic agents included sleeping pills, stewed cherries, strawberries, and mechanical irritation such as plucking of the eyebrows, squeezing the margin of the lids to straighten the lashes, and dyeing the eyebrows. Orange was the offending allergen in one case, in another butyn and hydrous wool fat in an ointment of sulfathiazole which had been used in a case of chronic catarrhal conjunctivitis. Four cases are reported in which pollen extracts gave good results against vernal conjunctivitis caused by pollen sensitivity. Workers in laboratories producing cultures of the tubercle bacillus noticed systemic reactions when the fumes from boiling suspensions of dead bacilli were inhaled, and after repeated exposures cutaneous sensitivity to tuberculin became decreased. Patients affected for many years by recurrent tuberculous iritis became free from symptoms after repeated inhalations of the fumes from boiling suspensions of tubercle bacilli. Animal experiments showed that sensitized guinea pigs could be desensitized by repeated inhalations of the fumes. (References.) M. Lombardo.

18

HYGIENE, SOCIOLOGY, EDUCATION, AND HISTORY

Davidson, Morris. **Status of compensation for ocular injuries in the United States.** Amer. Jour. Ophth., 1945, v. 28, Aug., pp. 856-871. (1 chart, 3 tables, references.)

Gaetjens, A. K. **Illumination and industrial visual tasks.** Trans. Amer. Acad. Ophth. and Otolaryng., 1945, 49th mtg. May-June, pp. 303-310.

The respective fields of eyesight specialists, industrial psychologists, and illuminating engineers are defined. Luminosity of 30 to 50 foot-candles, well diffused, usually using fluorescent lamps, has largely replaced the 5 to 10 foot-candles used previously. Eye comfort and actual visibility of the task are considered of especial importance. The latter is obtained partly by making the area of the actual visual task as bright as the surroundings, by sufficient general luminosity, use of light-colored enamel reflectors, and supplementary illumination. (7 illustrations.)

Charles A. Bahn.

Harrison, G. H. **Eye safety devices.** Trans. Amer. Acad. Ophth. and Otolaryng., 1945, 49th mtg., May-June, pp. 297-298.

In this country, 300,000 industrial eye accidents occur yearly necessitating absence from work. The cost is over a hundred million dollars yearly, suffering excluded. As a result of industrial injuries, 80,000 are blind in one eye and 8,000 blind in both eyes. Of these accidents 98 percent are unnecessary. Among the major causes are the nonuse or misuse of efficient safety devices. For example, protecting glasses must be adapted to the individual needs. They must be correctly and comfortably fitted and they must be kept clean and in good repair. Above all, they must be worn on the workman's face the entire time he is working. Only too often they are given out like a lot of patent-medicine samples to be used as, if, and when desired. In recent surveys more than 50 percent of workmen were found to have defective

vision or to lack protective glasses for their work. Charles A. Bahn.

Hurst, Hazel. **Placement of the blind in industry.** Trans. Amer. Acad. Ophth. and Otolaryng., 1945, 49th mtg. May-June, p. 310.

The author, who is blind, conducts a school for the visually handicapped in which placement of the blind in industry is emphasized, and 375 of the students have been placed in various industrial plants during the past three years. A guide dog is kept at the employee's bench during the eight-hour shift, especially to avoid confusion in case of emergency. The author feels that a regular periodic check-up of ocular condition and general health should be made on all sightless employees. Their record for attendance and willingness to work is excellent, and there is less absenteeism among the blind than among those with sight.

Charles A. Bahn.

Lo-Presti, Joseph. **The Connecticut experience with eye problems in small industries.** Trans. Amer. Acad. Ophth. and Otolaryng., 1945, 49th mtg., May-June, pp. 298-303.

Special eye services were made available through use of an ophthalmologist in 73 percent of the plants. In 66 percent the only screening test used was the visual-acuity test for distance. Periodic rechecks of vision were obtained for all employees in 20 percent of the plants. Wearing goggles was enforced by warning in 79 percent of the plants, but that this failed to be generally effective was shown by inspection trips through the plants. No reconditioning of individual equipment was done in any plant, yet all complained of the scarcity of the goggle supply. Most needed in visual safety are adequate visual screening methods and increased industrial nursing service under the supervision of the plant ophthalmologist or the medical director. Detailed practical instructions for removal of foreign bodies, burns, and so on are given in this article. Charles A. Bahn.

NEWS ITEMS

Edited by Dr. Donald J. Lyle
904 Carew Tower, Cincinnati 2

News items should reach the editor by the twelfth of the month

Deaths

Dr. Charles W. Cole, Norton, Kansas, died May 20, 1945, aged 67 years.

Dr. Martin I. Green, San Francisco, California, died June 30, 1945, aged 46 years.

Dr. Milton T. Jay, Portland, Indiana, died May 25, 1945, aged 77 years.

Dr. James C. McLallen, Cicero, Illinois, died June 14, 1945, aged 67 years.

Dr. Arthur L. Payne, Eau Claire, Wisconsin, died May 15, 1945, aged 79 years.

Dr. Tilden H. Singleton, Bowling Green, Kentucky, died June 6, 1945, aged 68 years.

Dr. Thomas F. Welsh, Salt Lake City, Utah, died May 13, 1945, aged 45 years.

Dr. Thomas J. Williams, Chicago, Illinois, died August 10, 1945, aged 63 years.

Miscellaneous

Particularly since the end of the war with Germany and Japan, it is likely that there will be need for additional volunteers for abstracting from foreign eye journals. Dr. William H. Crisp, 530 Metropolitan Building, Denver 2, would appreciate receiving information as to ophthalmologists who would be able and willing to abstract from French, German, Italian, Spanish, Portuguese, or any other foreign languages.

Requirements for fellowship in the American College of Surgeons

The Board of Regents of the American College of Surgeons, at a meeting held on June 24, 1945, took the following action:

1. That the College may recognize certification by the Board of Surgery or by a Surgical Specialty Board as evidence that the candidate has met the professional qualification requirements for fellowship in the American College of Surgeons. Each candidate will, however, be required to meet the ethical, personal, and professional qualifications established as standard for fellowship in the College. The following statement will appear in the revised "Requirements for Fellowship" in the College:

Candidates who have been recommended for fellowship by the Committees on Credentials and who have been certified by one of the following Boards, may be exempted from the requirement of submitting case records, or they may be required to submit only one half of the usual number of case records, that is, 25 records:

American Board of Neurological Surgery
American Board of Obstetrics and Gynecology
American Board of Ophthalmology
American Board of Orthopedic Surgery
American Board of Otolaryngology
American Board of Plastic Surgery
American Board of Surgery
American Board of Surgery (Proctology)
American Board of Urology

2. That applicants for fellowship whose qualifying medical degree shall have been obtained after January 1, 1944, shall be required to present evidence of having completed a minimum of four years of hospital service and graduate study of the basic medical sciences as they pertain to surgery in one or more acceptable hospitals and medical schools, of which three years shall have been spent in training in surgery or the surgical specialties in hospitals approved for such training by the American College of Surgeons. In the case of ophthalmology or otolaryngology, the period of training required shall be not less than three years, of which two years shall have been spent in hospitals approved for such training by the American College of Surgeons; and in the case of the combined specialty, ophthalmology-otolaryngology, the period of training required shall be not less than four years, of which three years shall have been spent in hospitals approved for such training by the American College of Surgeons. In the case of graduates of medical schools which withhold the medical degree until after the year of hospital internship, the date set will be January 1, 1945.

Irvin Abell, M.D.,
Chairman, Board of Regents

The fifteenth semiannual Postgraduate Conference in "Neuromuscular anomalies of the eyes" will be held at The Children's Memorial Hospital, in Chicago, by Dr. George P. Guibor, from October 21 to 26, 1945, inclusive. The class will be limited. No applications will be accepted after October 16th. A fee of $50 will be charged, $25 payable on enrollment, balance payable on registration. All correspondence and checks should be addressed to The Children's Memorial Hospital, 700 Fullerton Avenue, Chicago 14, Illinois.

The nineteenth annual Spring Graduate Course in Ophthalmology and Otolaryngology will be held at the Gill Memorial Eye, Ear, and Throat Hospital, Roanoke, Virginia, April 1 to 6, 1946.

Personals

Among the guest speakers in the Jackson County Health Forum lecture series will be Dr. Derrick Vail, who will speak on March 20, 1946, on "Save your eyesight."